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Technical manual

Ink jet printer

TM-J8000/J8000P

Issued Date	, ,
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English

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EPSON

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Revision Table

Revision	Page	Description
Rev. B	xii 5-4 5-8 5-10	Revision TM-J8000 Service Utility for Windows® is available. These pages are corrected to add information for the utility.
	5-9	Addition Information has been added on transporting the printer to the service center and back to the end user.
	x xi 3-18 3-19 3-20 3-21 3-22	Corrections The level of titles are corrected.

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Caution

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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For Safe Repair and Maintenance Work

Key to Symbols

The symbols in this manual are identified by their level of importance, as defined below. Read the following carefully before handling the product.

⚠ *WARNING:*

You must follow warnings carefully to avoid serious bodily injury.

⚠ *CAUTION:*

Observe cautions to avoid minor injury to your self, damage to your equipment, or loss of data.

✎ ***Note:***
Notes have important information and useful tips on the operation of your equipment.

Safety Precautions

⚠ WARNING:

- Do not replace the fuse in the Power circuit board assembly. Replacing this fuse may result in electric shock or fire. This fuse prevents electric shock and fire due to the input of an abnormal power supply; it is not provided to protect the components in the Power circuit board assembly.
  Replace the entire Power circuit board assembly if the fuse blows. Other components in the Power circuit board assembly are damaged if the fuse has blown.

- Use only the indicated power voltage. Use of any other power voltage may result in electric shock or fire.

- Measures to avoid electric shock:

  - Use an earthed power cable and plug it into an earthed power socket.
  - Correctly earth equipment connected to this product.
  - Disconnect the power cord and all other cables from this product before installing the product or conducting repair or maintenance.
  - Do not perform the installation of the product, repair, or maintenance during a lightning storm.
  - Never insert or remove the power plug with wet hands.

- In an abnormal status when the product produces smoke, abnormal smell, or abnormal noise, turn off the power switch at the rear of the product and pull the plug from the power socket. Continuing to use the product may result in electric shock or fire. The switch on the front of the product is software controlled and may not operate correctly in an abnormal status.

- If the power switch covers are attached when an abnormal status occurs, immediately pull the plug from the power socket. Continuing to use the product may result in electric shock or fire.

- Use only fuses supplied by Epson for the Main circuit board unit. Using any other fuse may result in electric shock or fire.

Safety Precautions (continued)

⚠ *CAUTION:*

Ink Cartridge

- ❑ *Do not put your finger inside the ink cartridge holder which contains the ink cartridge. The ink supply needle inside the holder may cause injury.*
- ❑ *Do not shake or drop an ink cartridge that has been installed. Ink leaking from the cartridge may get in your eyes. Also, ink stains can be impossible to remove from clothing.*
- ❑ *If ink from the cartridge gets in your eyes, rinse immediately with clean water and consult a doctor.*
- ❑ *Store ink cartridges out of the reach of children.*

Sharp Edges

- ❑ *The manual cutter is intended to cut paper. Pressing your fingers on the cutter may result in injury.*
- ❑ *The autocutter blades (round blade and fixed blade) are exposed when the roll paper cover is open. These cutter blades are intended to cut paper. Pressing your fingers on the cutter blades may result in injury.*
- ❑ *This product contains other metal parts with sharp edges in addition to the cutters. Pressing your fingers or hands on these parts may result in injury.*

Hot Parts

- ❑ *Some parts of the Main circuit board unit and the Power circuit board assembly may become hot. Turn off the power at least 10 minutes before handling these parts.*

Lithium Battery

- ❑ *A lithium battery is mounted on the Main circuit board unit. Do not short the terminals of this battery.*
- ❑ *Apply adhesive tape to insulate the terminals of a lithium battery that has been removed. Shorting of the uninsulated terminals may result in heat generation, fire, or explosion.*
- ❑ *Do not disassemble or modify the internal lithium battery. This may result in heat generation, fire, or explosion.*

Safety Precautions (continued)

⚠ *CAUTION:*

- ❑ *Do not incinerate or heat a lithium battery that has been removed. This may result in heat generation, fire, or explosion.*
- ❑ *Do not soak a lithium battery that has been removed in water. This may result in heat generation, fire, or explosion.*
- ❑ *Be sure to use the specified lithium battery, and to mount the + and - polarities correctly when connecting a lithium battery. Incorrectly connecting the battery may result in heat generation, fire, or explosion.*
- ❑ *Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

Precautions to Protect the Product

⚠ *CAUTION:*

Turning Product on its Side

- ❑ *When turning the product on its side, be sure to turn it with the ink cartridge side facing down. Do not turn the printer upside down since it may cause ink leakage. After turning the printer upright, check whether it prints properly.*

Transport

- ❑ *Before transporting the printer, prepare it for transport as described in "Preparing for Transport" in Chapter 5, "Repair and Troubleshooting." Failure to prepare the product for transport may result in defective printing or ink leakage.*
- ❑ *Replace the printer in the TM-J8000 packing case for transportation. Failure to use the specified packing case may cause ink leakage or damage to the printer.*
- ❑ *Do not turn the printer upside down during transportation.*

Connecting Cables

- ❑ *Do not connect a telephone line or drawer kick connector to the customer display connector. This may damage to the telephone circuit, printer, or drawer kick.*
- ❑ *Do not connect a telephone line to the drawer kick connector. This may result in damage to the telephone circuit or printer.*

Handling the Head Nozzle, Cap and Cleaning Plate

- ❑ *Do not touch the head nozzle, head cap and head cleaning plate with a finger or other object. This may cause damage.*

Handling the Circuit Boards

- ❑ *To prevent damage due to static electricity, wear a wrist-band for grounding before handling the internal printed circuit boards.*
- ❑ *To prevent damage due to static electricity, place the internal circuit boards on an antistatic rubber mat or other antistatic-treated surface when you remove the internal circuit boards.*
- ❑ *To prevent damage to the circuit boards, do not let them be subject to shocks or vibrations.*
- ❑ *Do not touch the circuit board terminals or cable terminals. Contamination due to touching the terminals may cause malfunctions.*

No Chemical Solvents

❑ Do not use alcohol, benzine, thinners, trichloroethylene, or ketone-based solvents to remove contamination. These may cause deterioration or damage to plastic and rubber parts.

Precautions on Handling and Disposal of the Product

Note:

Extending Ink Cartridge Life

❑ *The first ink charging is conducted automatically when the first ink cartridge is installed (when the printer is turned on). Do not turn the printer power off during the charging. If the power is turned off, the ink charging will be subsequently repeated, causing a dramatic reduction in ink cartridge printing life. This operation takes approximately two minutes. The* POWER *LED blinks during the ink charging and stays on as soon as the charging is complete.*

❑ *Do not remove the ink cartridge unless it is being replaced. A cleaning operation is conducted each time the ink cartridge is removed, causing a reduction in the ink cartridge printing life.*

❑ *Only press the* CLEANING *button to clean the head if printing problems are being experienced. The cleaning operation causes a reduction in the ink cartridge printing life.*

❑ *Do not turn off the power switch or open the printer cover while the* POWER *LED is blinking; head cleaning or the ink charging is being conducted.*

Ink Freezing

❑ *The interior of the printer and ink in the cartridge freezes if placed in an environment of -8 °C (18 °F) or colder. Approximately three hours are required before frozen ink can be used, if switched from -20 °C (-4 °F) environment to +25 °C (77 °F) environment, for example.*

Replacing the Ink Cartridge

❑ *Replace the ink cartridge while the printer is turned on. If the power is off during replacement, defective printing may occur because the ink cartridge replacement is not correctly detected.*

❑ *Use the EPSON SJIC1 ink cartridge. The use of any other cartridge may cause damage to the printer.*

Disposal

❑ *Dispose of or recycle used ink cartridges as prescribed under national and local laws.*

❑ *Dispose of the used printer as prescribed under national and local laws.*

❑ *Dispose of used lithium batteries as prescribed under national and local laws.*

Precautions on Handling and Disposal of the Product (continued)

Ink Discharging Cartridge

- ❑ *Do not use a used ink cartridge as the ink discharging cartridge.This may cause ink leakage.*
- ❑ *An ink discharging cartridge can be used up to 26 times. Cross out a number from the table on the label each time the cartridge is used. Dispose of the cartridge after it is used 26 times. Excess use will cause ink leakage.*

Display Module Connector

- ❑ *The display module connector (DM) cannot be used with a printer with parallel interface. This connector is only available for a printer with a serial interface.*

Printer Cover

- ❑ *Immediately close the printer cover after pressing the* CLEANING *button to start head cleaning.*

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About This Manual

Aim of the Manual

This manual was created to provide the information on printer maintenance and repair required by technicians who handle this work.

Contents of the Manual

The configuration of the manual is as follows:

Chapter 1, "Specifications"	Describes the features and basic specifications of the product.
Chapter 2, "Outline of Operation"	Describes the basic mechanical and electrical operations of the product.
Chapter 3, "Handling"	Describes the appropriate product handling methods during maintenance and repair.
Chapter 4, "Maintenance and Inspection"	Describes the maintenance and inspection items and procedures.
Chapter 5, "Repair and Troubleshooting"	Describes the required repair items and troubleshooting procedures.
Chapter 6,"Disassembly, Assembly, and Adjustment"	Describes the disassembly, assembly and adjustment procedures for the product.
Appendix	Gives reference information related to maintenance and repairs.

Related Software and Documents

Table 1 Related software and documents

Software/document name	Description
TM-J8000 Service Utility	This utility contains the following programs: Ink discharging sequence program, Head exchange sequence program, and LR adjustment sequence program, etc. To obtain the utility, contact the Epson service center.
TM-J8000 Service Utility User's Manual	This manual describes how to use the TM-J8000 Service Utility. To obtain the manual, contact the Epson service center.
TM-J8000/J8000P Operator's Manual	Describes product installation and handling procedures for the POS terminal operator.

Chapter 1
Specifications

Features

The TM-J8000 is a high-quality ink-jet POS printer that can print on roll paper or on slip paper. The printer has the following features:

- ❑ Low noise:
  - Low noise ink jet printing as required for high-quality restaurants
- ❑ High speed printing on normal paper:
  - Paper roll: approximately 15 lines / second
  - Slip paper: approximately 3 pages per minute for A4 size paper
- ❑ High printing quality:
  - High-quality ink jet head with 128 nozzles / 360 dpi for bar code and high density printing
- ❑ Easy to operate:
  - Easy paper roll loading
  - The printer's separate functional units allow easy maintenance
  - Clear and readable icon indicators
  - One step plug-in due to built-in universal power supply
- ❑ Bar code printing:
  - Bar code software such as UPC-A, Code 39, and Code 128 is supported.
- ❑ Interface:
  - High-speed bidirectional parallel, RS-232, or RS-485 interfaces can be used.
- ❑ Connecting and interlocking with EPSON peripheral devices:
  - EPSON customer display series (DM-D102-012 or DM-D203-012) can be connected to the serial model of the printer, and the IM 5*5 can be used with this printer.

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- ❑ Ink cartridge:
  - Using a large ink cartridge enables a long time between cartridge changes and low running cost (approximately 12,000,000 characters per cartridge with Font B continuous printing).
- ❑ Internal buffer:
  - 45 or 4 K receive buffer can be selected.
- ❑ Command protocol:
  - Command protocol is based on the ESC / POS® standard.
- ❑ Paper formats:
  - Narrow to wide format paper can be used—from a personal check (approximately 70 mm) to US letter (216 mm) using Font A, 36 to 130 column printing.
- ❑ Autocutter:
  - The autocutter uses a circular cut method with a high-quality blade and a long life (approximately 2,000,000 cuts).
- ❑ Paper roll sensor:
  - Paper end and paper near-end sensors are standard.
- ❑ Printer driver:
  - OCX driver and Windows driver are supported.

General Specifications (for both receipt and slip)

Printing specifications

- ❑ Printing method: Serial inkjet dot matrix
- ❑ Printing density: 360 dpi × 360 dpi
- ❑ Printing direction: Bidirectional (logical seeking)
- ❑ Paper feeding method: Friction feed method
- ❑ Printing speed: Refer to Table 1-1
- ❑ Character spacing, Character size: Refer to Table 1-2
- ❑ Characters per line: Refer to Table 1-3
- ❑ Head control method: Fine / Economy

Table1-1 Printing speed

	Slip		Receipt		Slip		Receipt	
Head control method	Font A 65 CPL	Font B 80 CPL	Font A 20 CPL	Font B 25 CPL	Font A 130 CPL	Font B 158 CPL	Font A 42 CPL	Font B 51 CPL
Fine	6.8	10.0	11.8	16.9	4.2	6.2	9.0	13.1
Economy	7.8	11.3	12.6	18.1	4.9	7.3	10.1	14.7

(CPL: characters per line, LPS: lines per second)

Table1-2 Character spacing, character size

	Font A (Default Setting)	Font B
Font type	Sans serif	Sans serif
Dot structure (W × H) (Including Right space)	22 × 48 dots	18 × 36 dots
Right space	4 dots	2 dots
Character size	1.48 × 3.32 mm	1.20 × 2.47 mm

Table1-3 Character per line

	Font A (Default Setting)		Font B	
Characters per line	Receipt	Slip (68 to 215.9 mm)	Receipt	Slip (68 to 215.9 mm)
	42 characters	38 to 130 characters	51 characters	46 to 158 characters

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Character specifications

- ❑ Number of characters:
  - Alphanumeric characters: 95
  - International characters: 32
  - Extended graphics: 128 × 9 pages (including two space pages)
- ❑ Character structure: Refer to Table 1-2
- ❑ Character types: Refer to Table 1-2

Ink cartridge

- ❑ Type: Exclusive ink cartridge
- ❑ Specifications: Refer to Table 1-4

Table 1-4 Ink cartridge specification

Name	Ink Cartridge SJIC1
Weight (*1)	Approximately 250 g (*1)
Dimensions	39.1 × 100.2 × 139.6 mm (W × H × D)/(1.5 × 5.5 × 3.9 in.) (Including labels/Excluding protrusion)
Case color	Transparent black
Ink color	Black
Maximum number of printable characters	Approximately 12,000,000 characters (*2)
Effective period	Within two years after production (Normal temperature)

Notes: (*1) The weight indicates the gross weight of the ink cartridge, with labels, not including the individual outer box.

(*2) The maximum number of printable characters are measured with Font B (economy) using the EPSON standard printing patterns.

Interface

RS-232 serial interface

Table 1-5 RS-232 serial Interface specifications

Item	Content
Data transmission	Serial
Synchronization	Asynchronous
Handshaking	DTR/DSR or XON/XOFF control
Signal levels	MARK = –3 V to –15 V Logic "1" SPACE = +3 V to +15 V Logic "0"
Stop bits	1 or more
Connector (printer side)	Female D-SUB 25 pin connector

NOTES: * The data word length, baud rate, and parity depend on the DIP switch settings.

* The stop bit for the printer side is fixed to 1.

IEEE 1284 bidirectional parallel interface (Parallel interface specifications)

<Compatibility Mode> Data transmission from Host to Printer: Centronics compatible

Table 1-6 Compatibility mode specifications

Item	Content
Data transmission	8-bit Parallel
Synchronization	Externally supplied nStrobe signals
Handshaking	Ack and Busy signals
Signal levels	TTL compatible

<Reverse Mode> Data Transmission from Printer to Host

The status data transmission from the printer to the host proceeds in the Nibble or Byte mode. This mode allows data transmission from the asynchronous printer under the control of the host.

Data transmissions in the Nibble Mode are made via the existing control lines in units of four bits (Nibble). In the Byte Mode, data transmissions proceed by making the eight-bits data lines bidirectional. Both modes fail to proceed concurrently with the Compatibility Mode, thereby causing half duplex transmission.

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RS-485 serial interface

(RS485 serial interface is a dealer option.)

Table 1-7 RS-485 serial Interface specifications

Item	Content
Data transmission	Serial
Synchronization	Asynchronous
Handshaking	DTR/DSR or XON/XOFF control
Signal levels	2.0 to 5.0 V Logic "1" 0.0 to 0.8 V Logic "0"
Baud rates	2400, 4800, 9600, 19200 bps
Parity settings	None, even, odd
Stop bits	1 or more
Connector	Female D-SUB 25 pin connector

Notes: * The handshaking, data word length, baud rate, and parity depend on the DIP switch settings.

* Data transmitted from the printer has 1 stop bit (fixed).

DIP switches

Serial interface model

Table 1-8 DIP switch 1

SW 1	Function	ON	OFF
1	Data reception error	Ignored	Prints "?"
2	Receive buffer capacity	45 bytes	4K bytes
3	Handshaking	XON/XOFF	DTR/DSR
4	Word length	7 bits	8 bits
5	Parity check	Yes	No
6	Parity selection	Even	Odd
7	Transmission speed selection Refer to Table 1-9		
8			

Table 1-9 Transmission speed

Transmission Speed(BPS)	SW 1-7	SW 1-8
2400	ON	ON
4800	OFF	ON
9600	ON	OFF
19200	OFF	OFF

(BPS: Bits Per Second)

Table1-10 DIP switch 2

SW 2	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline or receive buffer full
2	Customer display (DM-D) connection	Connected	Not connected
3	Head rank switching	Rank B	Rank A
4	Power switch mode setting	Power switch fixing mode	Normal mode
5	Interlocking operation with IM	Interlocking	Not interlocking
6	Internal use	—	Fixed to OFF
7	I/F pin 6 reset signal	Enabled	Disabled
8	I/F pin 25 reset signal	Enabled	Disabled

Note: Changes in DIP switch settings (excluding switches 2-7 and 2-8, interface reset signals) are recognized only when the printer power is turned on or when the printer is reset by using the interface. If the DIP switch setting is changed after the printer power is turned on, the change does not take effect until the printer is turned on again or is reset.

Parallel interface model

Table 1-11 DIP switch 1

SW 1	Function	ON	OFF
1	Automatic line feed	Always enabled	Always disabled
2	Receive buffer capacity	45 bytes	4K bytes
3	Undefined	—	—
4	Undefined	—	—
5	Undefined	—	—
6	Undefined	—	—
7	Undefined	—	—
8	Undefined	—	—

Table1-12 DIP switch 2

SW 2	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline or receive buffer full
2	Internal use (Do not change settings)	—	Fixed to OFF
3	Head rank switching	Rank B	Rank A
4	Power switch mode setting	Power switch fixing mode	Normal mode
5	Interlocking operation with IM	Interlocking	Not interlocking
6	Internal use	—	Fixed to OFF
7	Internal use (for serial interface)	—	Fixed to OFF
8	I/F pin 31 reset signal (Do not change settings)	Fixed to ON	—

Note: Changes in DIP switch settings (excluding switches 2-7 and 2-8, interface reset signals) are recognized only when the printer power is turned on or when the printer is reset by using the interface. If the DIP switch setting is changed after the printer power is turned on, the change does not take effect until the printer is turned on again or is reset.

Internal buffer

- ❑ Receive buffer: Selectable as 45 or 4K bytes using the DIP switch
- ❑ User-defined buffer (both for user-defined characters and downloaded bit images):

  Receipt: 12K bytes
  Slip: 5K bytes

- ❑ Macro buffer: 2K bytes

Electrical characteristics

- ❑ Supply voltage: AC85 V to 264.5 V (only for single phase)
  Universal power supply is built in.
- ❑ Current consumption: 25 W (Operating)

Reliability

- ❑ Printer mechanism life (when printing alphanumeric characters):

  Receipt section: 10,000,000 lines
  Slip section: 5,000,000 lines

  Printer is defined to have reached the end of its life when it reaches the beginning of the wearout period.

- ❑ Print head life: 800 million dots / nozzle
- ❑ Autocutter life: 2,000,000 cuts
- ❑ MTBF: 180,000 hours

  Failure is defined as Random Failure occuring during the time of the Random Failure Period.

- ❑ MCBF: 37,000,000 lines

  This is an average failure interval based on failures relating to wearout and random failures up to the life of 12 million lines.

Dimensions/Weight

- ❑ Dimension: 325 × 200 × 300 mm (W × H × D)
  (12.8 × 7.9 × 11.9 in.)
- ❑ Weight: Approximately 9 kg

Environmental condition

- Temperature and Humidity:

  Printing: 10 to 35 °C, 20 to 80% RH (non-condensing)
  (Area which is shaded in Figure 1-1.)

  Standby: 5 to 40 °C, 20 to 80% RH (non-condensing)
  (Area which is surrounded with a solid line in Figure 1-1.)

  Storage: When packed (ink not filled): –20 to 60 °C, 5 to 85% RH (non-condensing)
  (within 120 hours at –20 °C or 60 °C)

  When ink is filled: –20 to 40 °C, 20 to 85% RH (non-condensing)

- Absolute maximum rated temperature: 70 °C
  (The printer must be kept below 70 °C whenever it is operating or in storage.)

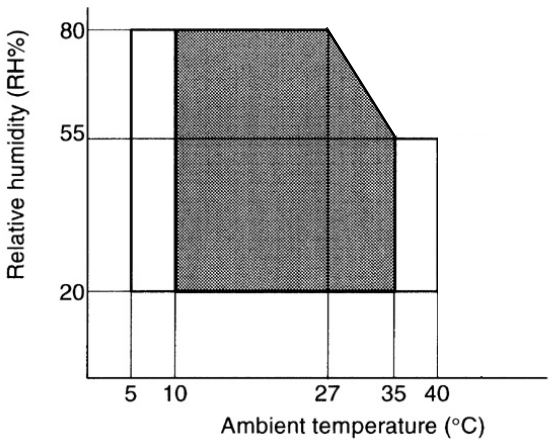


Figure 1-1 Operating temperature and humidity range

- Operating pressure: 700 to 1050 hPa
  (approximately –20 m to 2000 m height above the sea level)

- Acoustic noise: Operating: Approximately 49 dB (Bystander Position)

EMI and safety standards applied

The following standards are applied only to the printers that are so labeled.

Europe	CE marking	
North America	EMI	FCC Class A
	Safety standards	UL 1950-3rd
		CSA C22.2 No.950
Japan	EMI	VCCI Class A
Oceania	EMC	AS/NZS 3548

Receipt Section

Paper feeding mechanism

- ❑ Paper feeding method: Friction feed method
- ❑ Minimum paper feeding pitch: Possible to set 0.141 mm (1/180 inch) minimum
- ❑ Paper feeding speed: 35.3 ms/l, when the paper feeding pitch is set to 4.23 mm (1/6 inch)
  120 mm/s (approximately 4.7 inches/s, 28.3 l/s) when continuous paper feeding is performed.

Paper roll specification

- ❑ Paper type: Normal quality paper (possible to use only single-ply sheet)
- ❑ Form: Paper roll
- ❑ Paper width: 76 ± 0.5 mm
- ❑ Paper thickness: 0.06 to 0.09 mm
- ❑ Paper weight: 52.3 to 64.0 g/m^2 (JIS P8124)
- ❑ Spool diameter: Inside: 10 mm or more
- ❑ Paper roll diameter: Outside: 83 mm or less

Autocutter

- ❑ Cutting method: Circular cut method
- ❑ Cutting type: Cutting with no point left uncut (called “Full cut”)

Slip Section

Paper feeding mechanism

- ❑ Paper feeding method: Friction feed method
- ❑ Minimum paper feeding pitch:
  Possible to set 0.141 mm (1/180 inch) minimum
- ❑ Paper feeding speed: 35.3 ms/l, when the paper feeding pitch is set to 4.23 mm (1/6 inch)
  120 mm/s (approximately 4.7 inches/s, 28.3 l/s) when continuous paper feeding is performed.

Slip paper (includes personal check)

- ❑ Paper type: Normal quality paper (possible to use only single-ply sheet)
- ❑ Paper size: Width: 68 to 215.9 mm
  Length: 68 to 297.0 mm
- ❑ Paper thickness: 0.09 to 0.15 mm
- ❑ Weight: 64 to 110 kg/m^2 (JIS P8124)

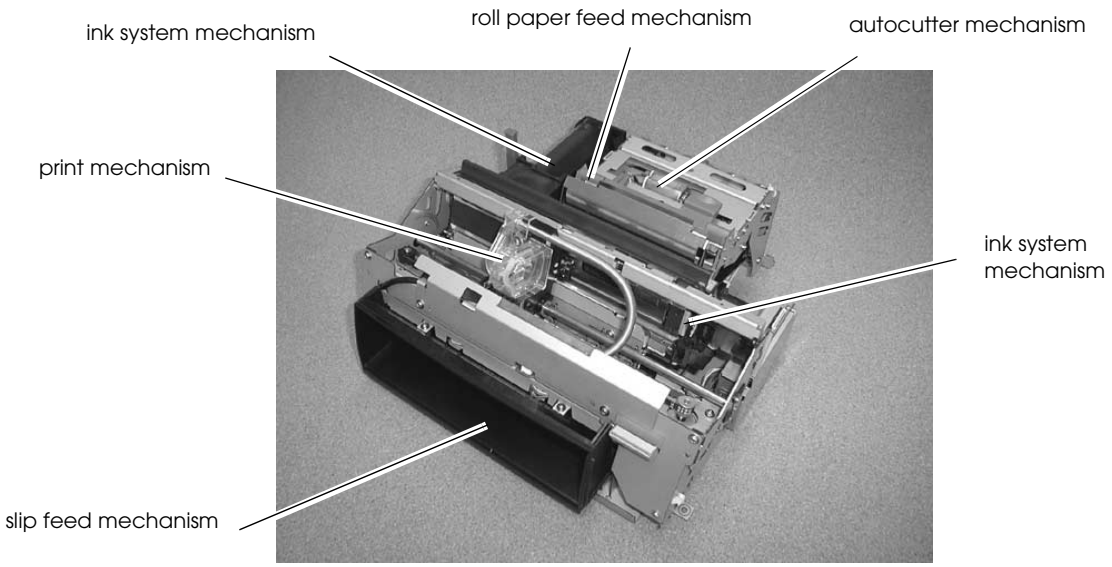
Chapter 2

Outline of Operation

M-J8000 printer mechanism

The printer is comprised of the following major mechanisms.

- ❑ Print mechanism
- ❑ Roll paper feed mechanism
- ❑ Slip feed mechanism
- ❑ Detector mechanisms
- ❑ Autocutter mechanism
- ❑ Ink system mechanism



(*) Detector mechanisms are not shown in this illustration.

Figure 2-1 External appearance of M-J8000 printer mechanism

Print mechanism

This mechanism is comprised of the following: the print head unit (128-nozzle unit, with nozzles arranged in two vertical columns with 64 nozzles each), the head carriage assembly, carriage frame ("Frame, carriage"), the platen, the carriage motor assembly, the carriage-guide shaft ("Shaft, carriage guide"), the carriage belt ("Belt, carriage"), and the carriage transmit pulley plate assembly.

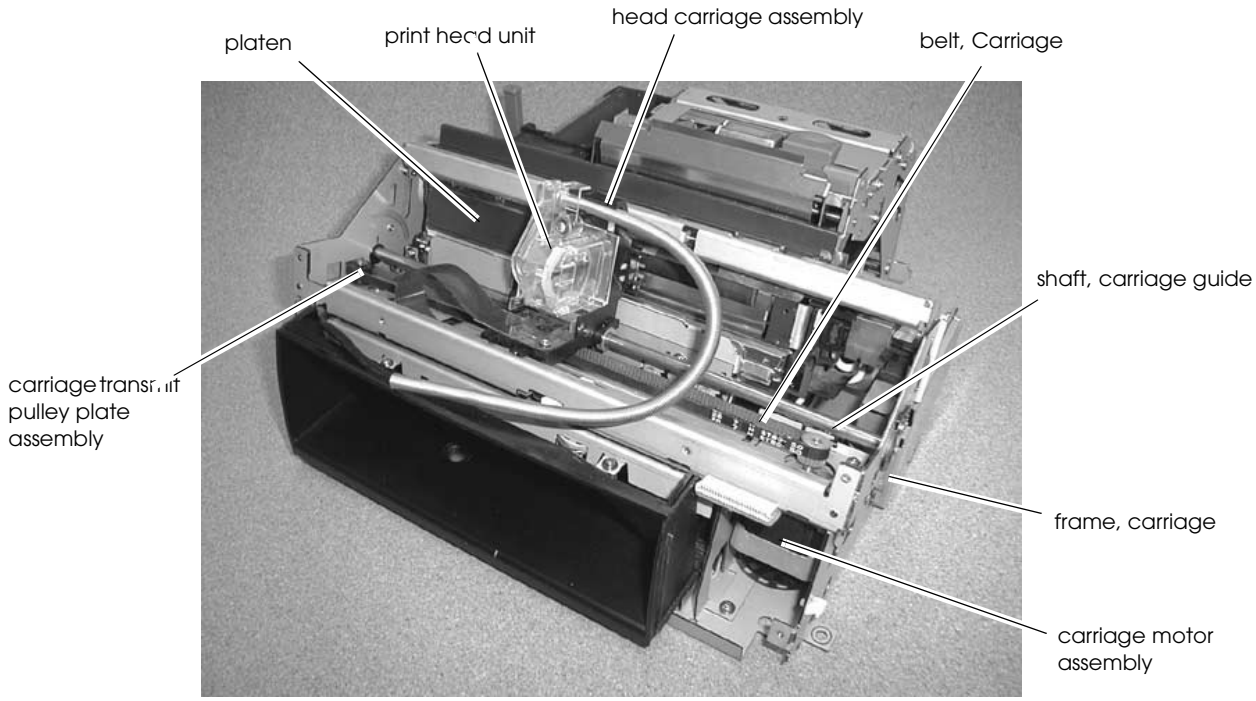


Figure 2-2 Print mechanism

Movement of the print head unit

When the carriage motor ("Motor, carriage") rotates the carriage-drive pulley ("Pulley, carriage drive") in the direction of the arrow A (see Fig. 2-3), the pulley drives the carriage belt ("Belt, carriage"), together with the head carriage assembly (which is affixed to the carriage belt), in the arrow A' direction.

In the same way, rotation of the carriage motor in the arrow B direction causes the head carriage assembly to move in the arrow B' direction.

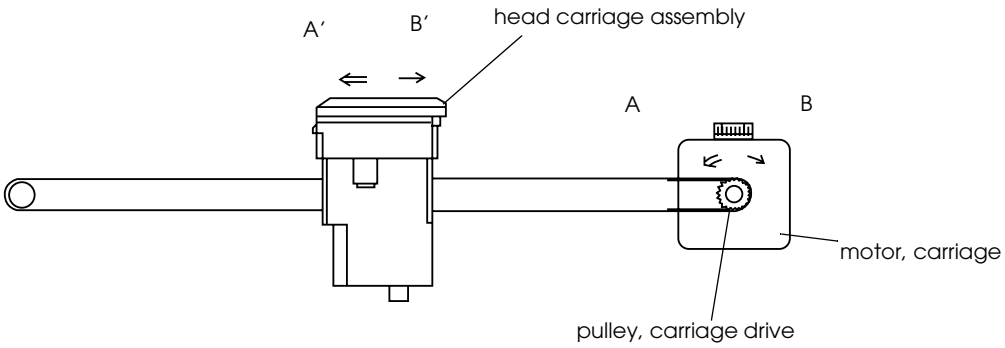


Figure 2-3 Movement of the Print head unit

Printing

The ink-jet head consists of the following components: head chip that holds the 128 ink-jet nozzles and the 128 electrostatic actuators (one actuator per nozzle), base head that supplies the ink, head board containing the signal circuit, thermistor (mounted on head board; used to monitor the temperature), left and right driver ICs (used to drive the head chip), and a cover head that protects the head chip and driver ICs.

The head chip has128 nozzles; two rows (A and B) of 64 nozzles each. The nozzle arrangement is shown in Figure 2-6. Each driver IC drives the nozzles of a single row.

The ink-jet head is connected to the Main board by an FPC through a connector.

The printing sequence is as follows:

1. The driver ICs apply electric pulses to the appropriate nozzles, where timing is according to the phase changes of the carriage motor.

2. The electrostatic actuators are activated by the pulse, causing ink to eject from the nozzles.

3. The ink adheres to the paper, forming printed dots.

4. A printed pixel (or segment) consists of two dots. To print a segment, two consecutive pulses are applied to the relevant nozzle (to print to consecutive dots).

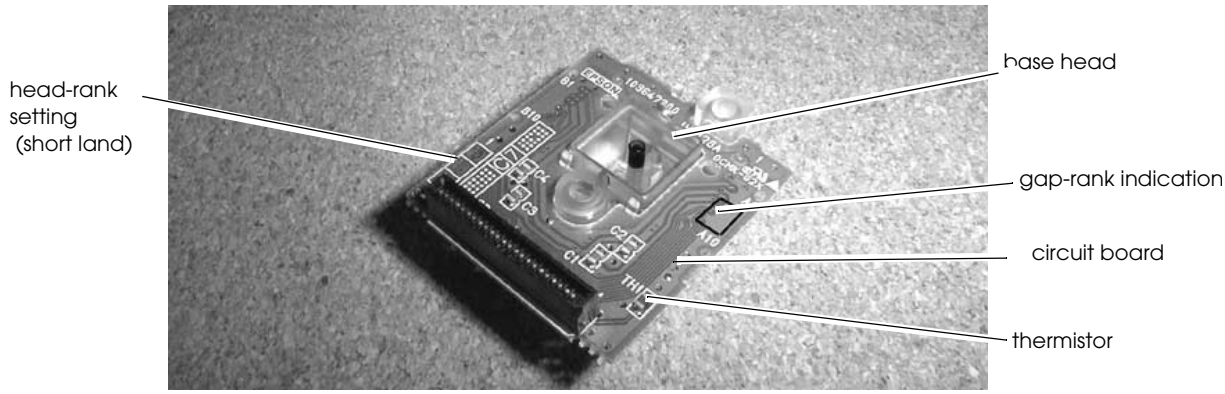


Figure 2-4 Head (top view)

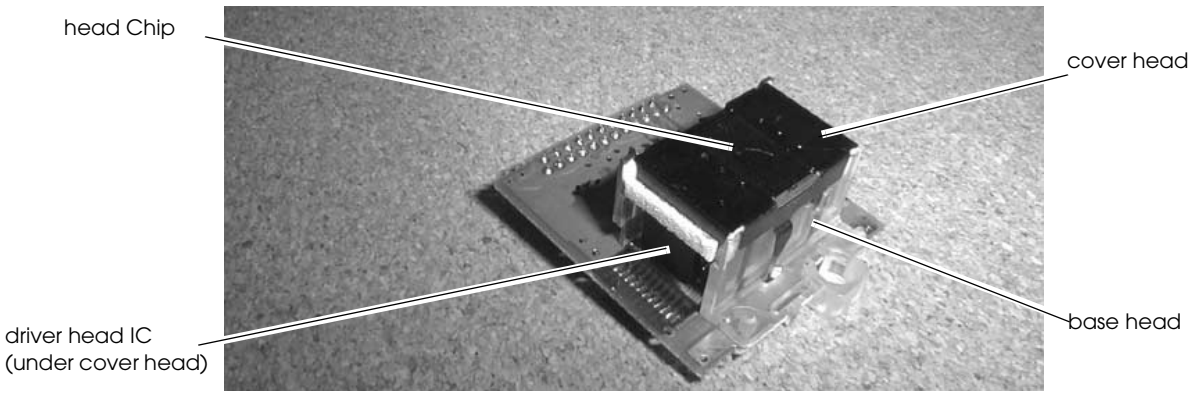


Figure 2-5 Head (bottom view)

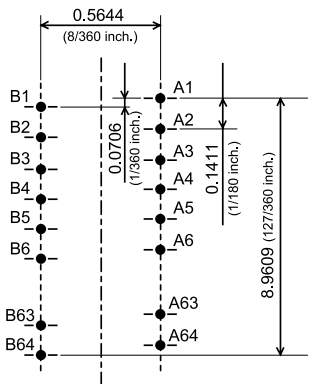


Figure 2-6 Nozzle arrangement

Data Input and Printing

Figure 2-7 shows a block diagram of the driver IC. Each driver IC receives input through its DI (data) and XSCL.(sync) lines. These inputs are implemented separately on each of the two driver ICs (so that each receives data independently).

The serial print data enters through the DI and moves into the SHIFT REGISTER in sync with the XSCL signal. The data then moves into the LATCH in accordance with the LP timing signal. The latched data passes through the inverter and sets the appropriate bits of the segment driving, causing the nozzles to operate.

To control actual printing, the driver IC feeds the V3 terminal voltage waveform selectively to the COM and SEG outputs. (See Fig. 2-8.) Ink ejection is generated when there is a difference between the COM and SEG output voltages. To print a segment, the IC produces a positive difference for the first pulse followed by a negative difference for the second pulse. To withhold a segment, the IC maintains a zero difference.

The level and width of the applied pulse is adjusted according to the head rank (specific to each head), the gap rank, and the temperature as detected by the thermistor. On the Main circuit board, the head rank read information indicated by short-land setting. The gap rank sets DIP switch on the Main circuit board to match the gap-rank marking on the head board.

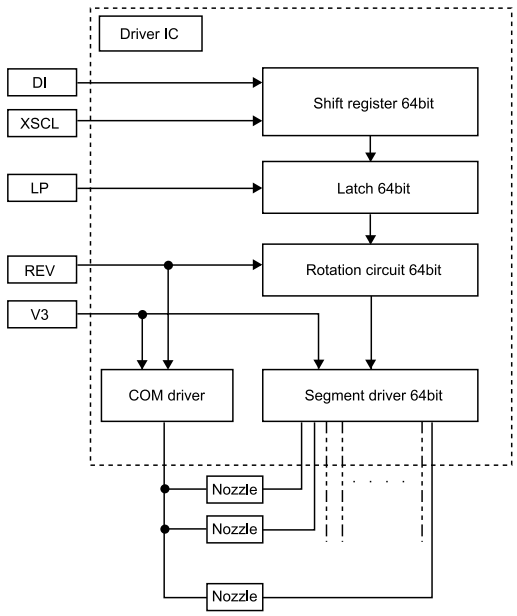


Figure 2-7 Block diagram of driver IC

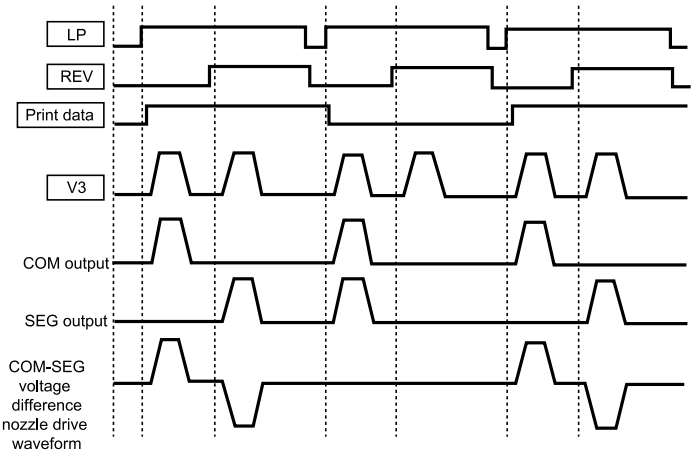


Figure 2-8 Head drive implementation

Roll paper feed mechanism

This mechanism comprises the paper-feed motor assembly, the power transmission mechanism, the roll paper cover unit, the roll paper guide unit, and the detector mechanisms. For explanations about the detector mechanisms (which includes the roll paper detection mechanism, the roll paper near-end detection mechanism, and the cover-open detection mechanism), see “Detector mechanism” in this chapter. The paper-feed operation is performed by driving the paper-feed motor.

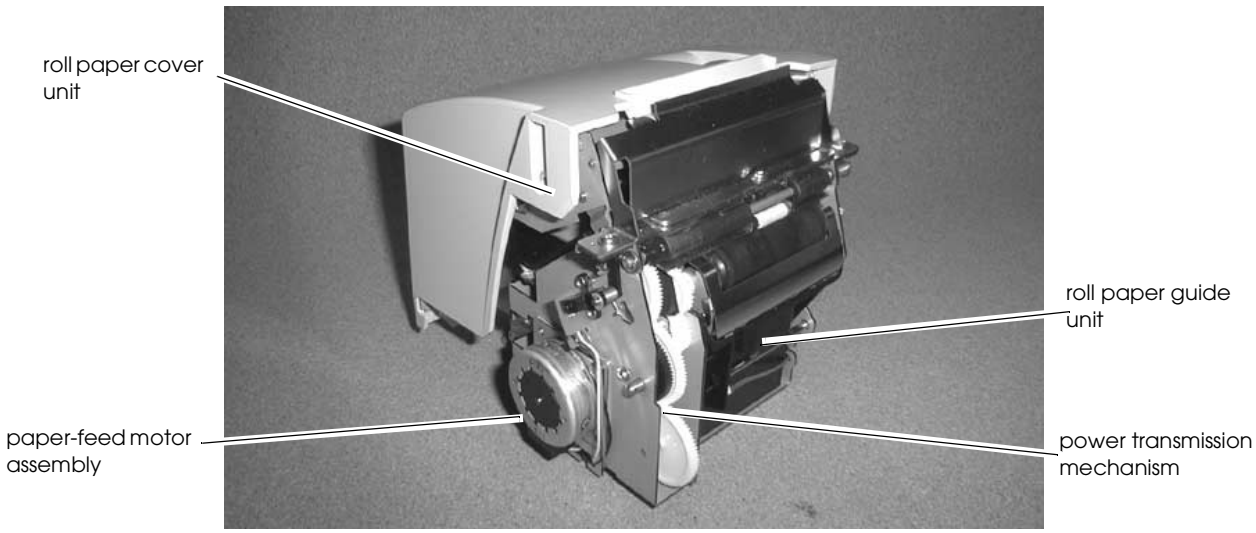


Figure 2-9 Roll paper feed mechanism

Paper feeding

The paper-feed motor assembly consists of a step motor and a gear ("Gear, paper feed motor"). The rotation of the motor propagates through three gears ("Gear, J/C changeover", "Gear, paper feed reduction", and "Gear, paper feed transmit") on the power-transmission mechanism, and causes the paper-feed roller assembly to rotate. The paper-feed roller assembly comprises two main components: a paper-feed roller ("Roller, paper feed"), which consists of a wide rubber roller and a shaft, and a paper-feed gear ("Gear, paper feed") that is pressure-fitted to the shaft. The paper-feed roller is pressed against the paper-hold roller ("Roller, paper hold") at fixed pressure, so that the inserted roll paper is secured in place and can be fed by the turning action of the feed roller.
The roll paper tension mechanism is a friction-clutch device that maintains a fixed tension on the paper. When paper-feed is in progress, this tension stretches the paper between the paper-feed roller and the paper-guide plate ("Plate, paper guide") creating a smooth surface for printing.

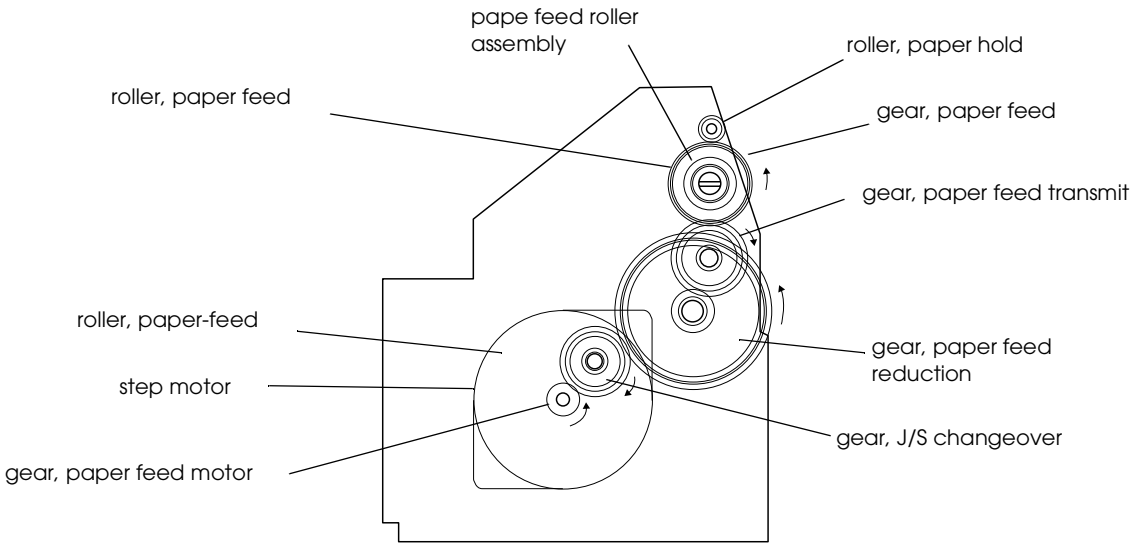


Figure 2-10 Paper feeding (1)

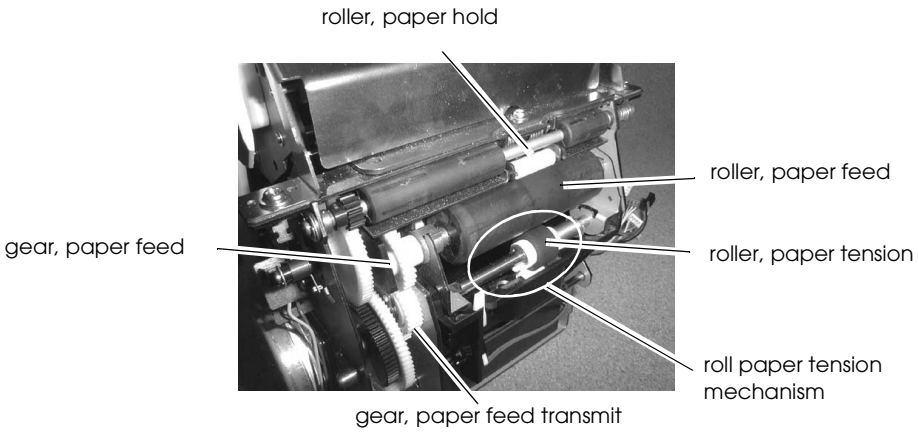


Figure 2-11 Paper feeding (2)

Paper loading

The paper roll is loaded by putting it into the roll paper guide unit (which includes the paper supply section). The roll paper guide unit can be accessed by lifting the lock lever ("Lever, CS lock") and opening the cover ("Roll paper cover unit"). The operator puts the paper roll into place, pull out a small amount of the paper, and closes the cover. This causes the paper to set into the path illustrated in the figure below. When the cover is closed, the paper-feed gear ("Gear, paper feed") engages the paper-feed-transmission gear ("Gear, paper feed transmit"), enabling the paper to be fed. Though a small paper slackness between the paper guide roller and paper-guide plate will occur right after installing the paper, a fixed-length feed function (linked to the cover-open detection signal) will eliminate the paper slackness. This mechanism allows for easy loading of paper rolls and easy clearing of paper jams.

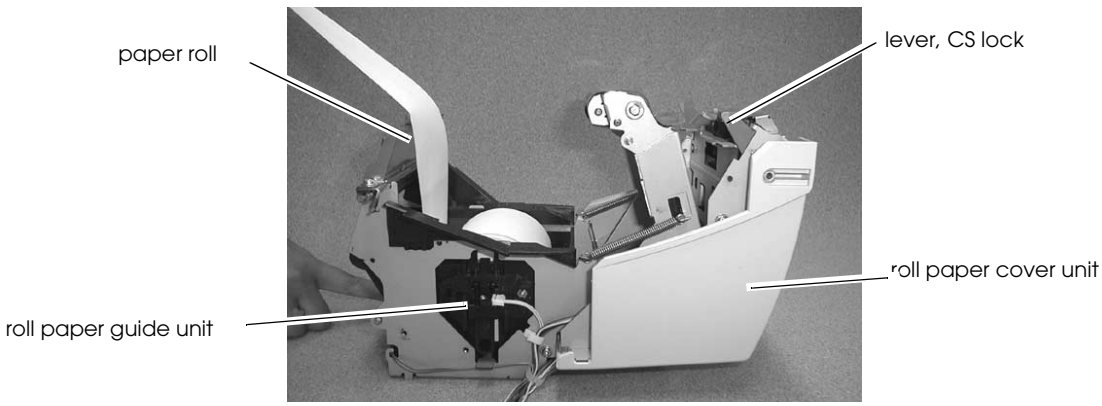


Figure 2-12 Paper loading (1

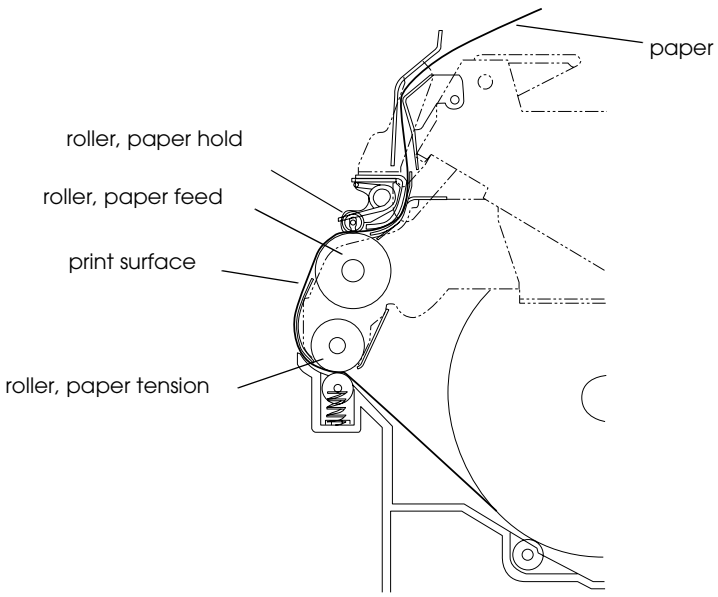


Figure 2-13 Paper loading (2)

J/S changeover mechanism

This printer uses a single motor to feed both roll paper and slips. The J/S changeover mechanism switches the gear train so as to drive the correct paper. The mechanism consists of a gear ("Gear, J/S changeover"), solenoid ("Solenoid, J/S changeover"), and lever ("Lever, J/S changeover"). Energizing the solenoid causes the lever to slide the gear so that it engages the paper-feed reduction gear ("Gear, paper-feed reduct") on the roll paper side, completing the gear train for roll paper feed. De-energizing the solenoid causes the lever to spring back (pulled by the Spring, J/S changeover), so that the gear slides to the other side and engages the slip feed reduction gear ("Gear, slip-feed reduction") on the slip side, completing the gear train for slip feed.

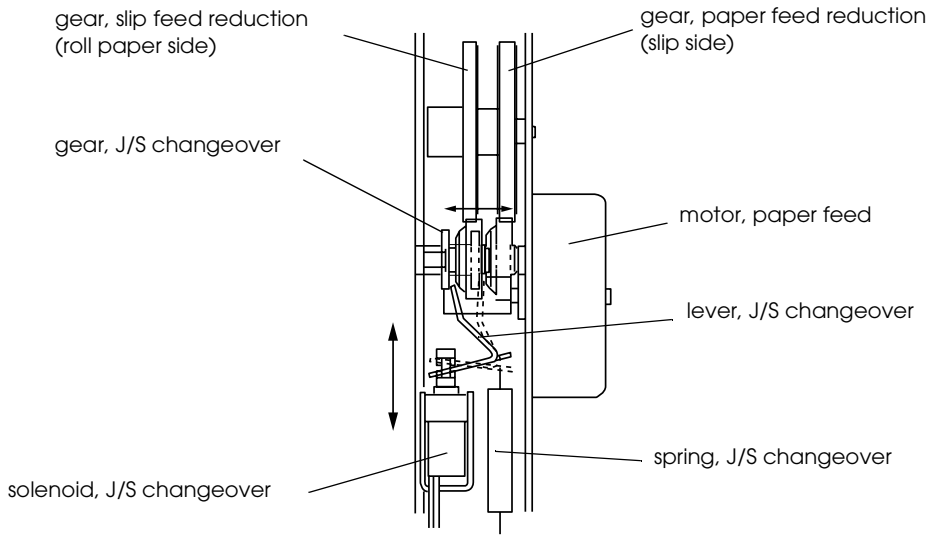


Figure 2-14 J/S changeover mechanism

Slip feed mechanism

This mechanism consists of a slip paper guide section and a slip feed roller section. The guide section guides the paper to the print position. The roller section is comprised of three sets of rollers that transport the slip.

Slip paper-guide section

This section consists of four major components: the front slip guide ("Paper guide, slip, front"), the upper slip guide ("Paper guide, slip, upper"), the lower slip guide ("Paper guide, slip, lower"), and the platen ("Paper guide, platen"). The paper path accepts slip paper up to a maximum width of 215.9mm. A slip holder guide ("Paper guide, slip hold, top") is attached at the top of the platen to guide the slip as it moves upward from the print area.

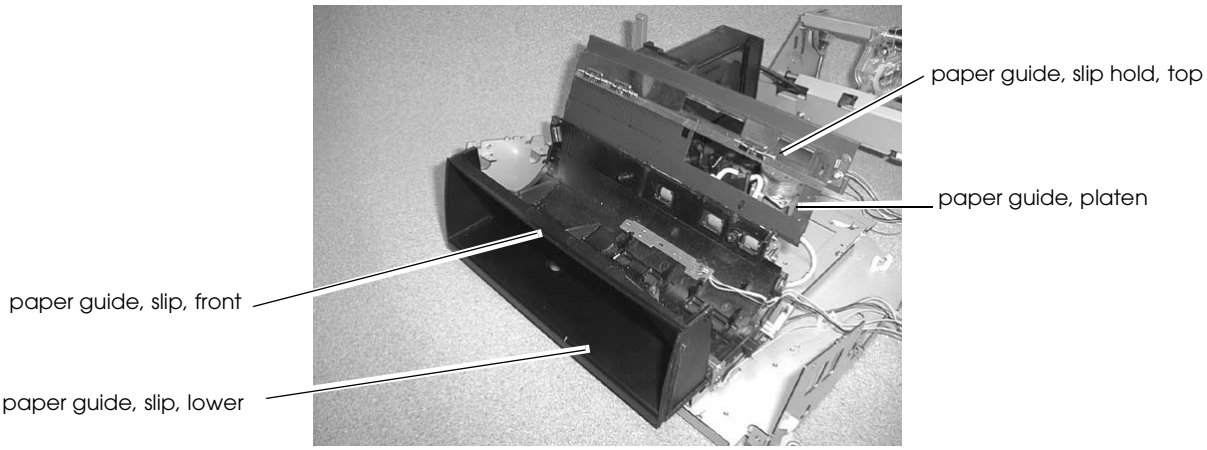


Figure 2-15 Slip paper guide Section

Slip Feed Roller Section

This section consists of three sets of rollers: front-feed rollers, center-feed rollers, and top-feed rollers.

The front-feed rollers ("Roller, slip feed, front" and "Roller, slip hold, front") pull the inserted slip paper into the paper path.

The center-feed rollers ("Roller, slip feed, center" and "Roller, slip hold, center") feed the slip paper during printing on the slip paper.

The top-feed rollers ("Roller, slip feed, top" and "Roller, slip hold, top") feed the lower edge of the slip paper eject it from the printer.

When the J/S changeover mechanism is switched to the slip-feed mechanism side, the drive power from the paper feed motor ("Motor, paper feed") drives each gear on the drive side; all three of the slip-feed rollers rotate simultaneously.

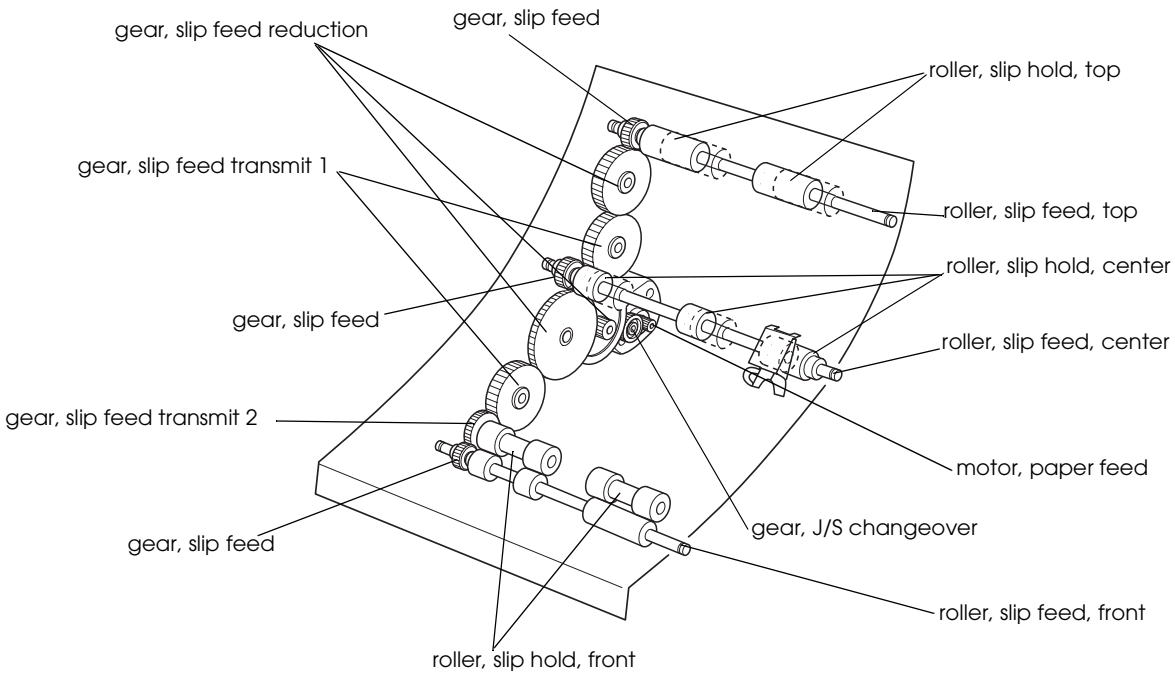


Figure 2-16 Slip feed roller Section

Front-feed rollers

The driven rollers ("Roller, slip hold, front") are opened and closed by a shutter mechanism to which they are linked.

Center-feed rollers

The surface of the rollers that make contact with the paper have been blast-coated with metal powder. The three driver rollers ("roller, slip hold, center") are supported on the groove of the shutter frame ("Frame, shutter") by the shaft ("Shaft, slip hold, center"). The paper is held by the force of the spring ("Spring, slip hold, center) through the lever ("Lever, sleeve hold, center").

Top-feed rollers

The driven rollers ("Roller, slip hold, top") are supported by lever ("Lever, slip hold, top"). The solenoid ("Solenoid, slip hold, top") engaged at the tip of the lever causes the lever to open and close. The operation to absorb the solenoid's iron core causes the rollers to open. The rollers will then stay open even after the solenoid power is shut off.

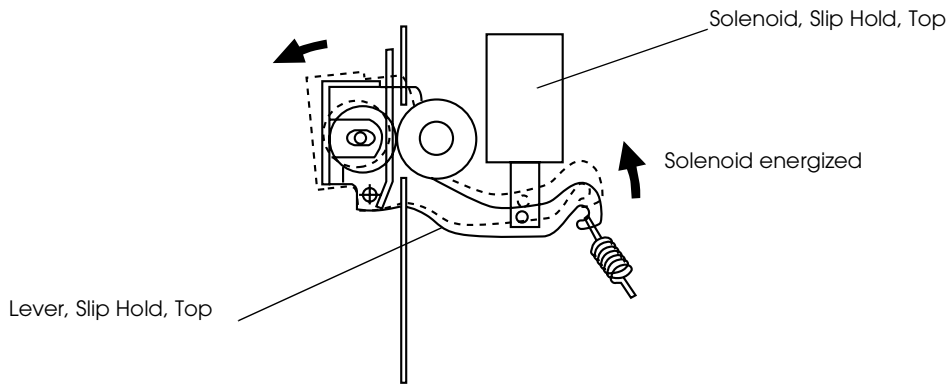


Figure 2-17 Top Feed-Roller Section

Form stopper

The form stopper positions the slip as it inserted. The stopper is attached to a fulcrum on the base frame ("Frame, base").When the printer is in standby, the force of the spring ("Spring, form stopper") forces the tip of the stopper into the paper path, so that the paper cannot enter. When the printer is ready to start printing, the action of the shutter mechanism cause the lever ("lever, form stopper O/C") to rotate in the direction A1, pushing the form stopper downward in the direction A2.

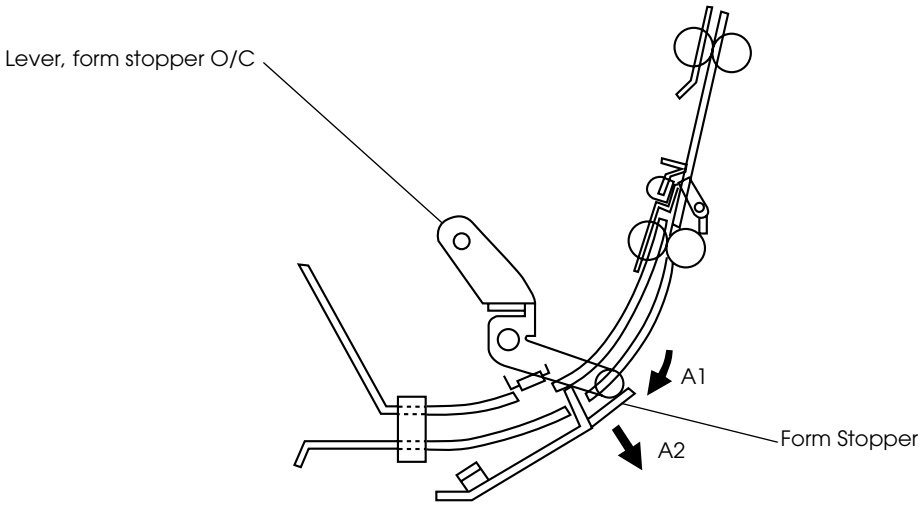


Figure 2-18 Form Stopper

Shutter mechanism

Operating principle

The purpose of this mechanism is to hold the entering slip firmly against the platen at the open area of the Platen where carriage passes through, so that the sheet is correctly guided up to the top slip-holder paper guide ("Paper guide, slip hold, top"). The shutter mechanism also controls the open / close action of the front-feed rollers and the form stopper.

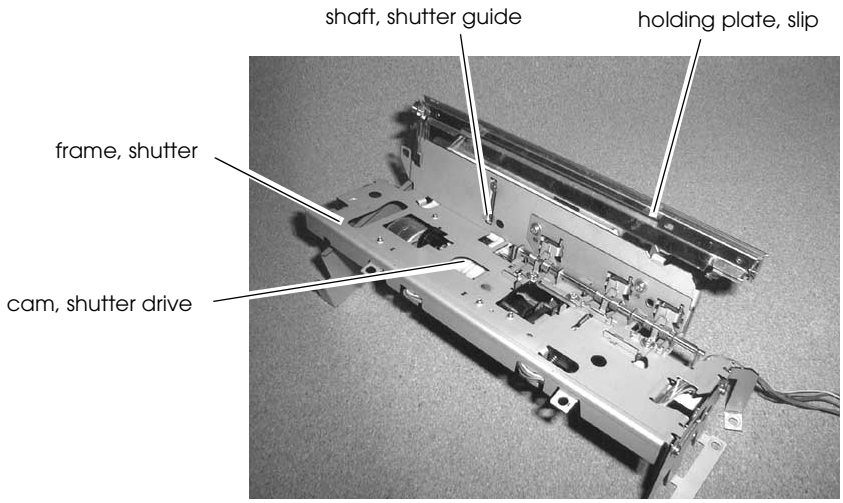


Figure 2-19 Shutter mechanism (1)

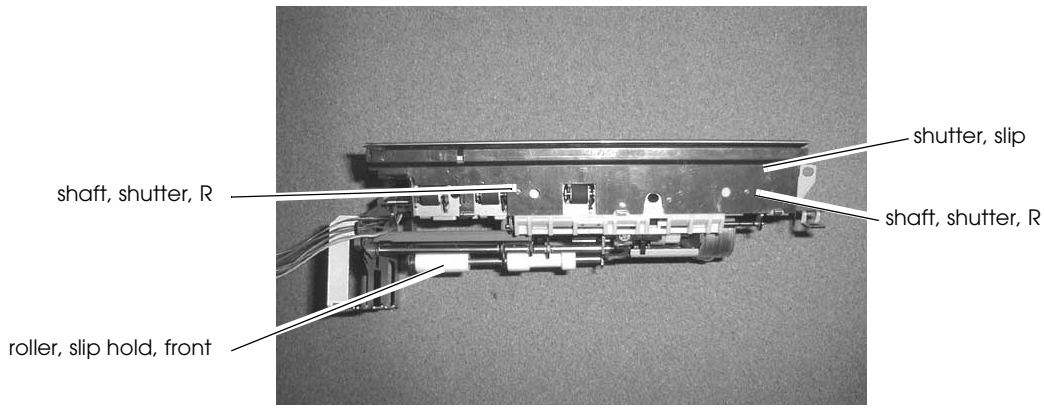


Figure 2-20 Shutter mechanism (2)

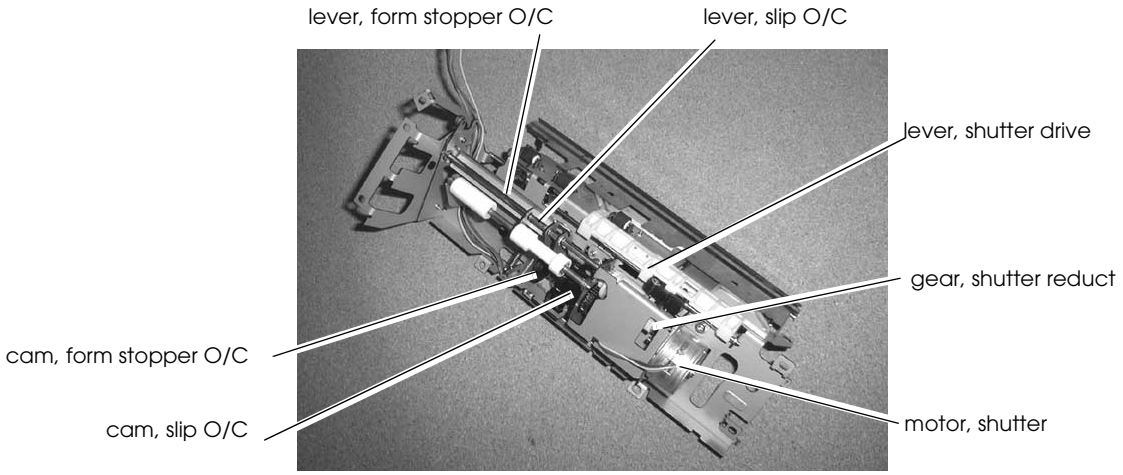


Figure 2-21 Shutter mechanism (3)

The main components are: the shutter frame ("Frame, shutter"), the motor ("Motor, shutter"), the reduction gear ("Gear, shutter reduct"), the drive cam ("Cam, shutter drive"), the slider ("Slider shutter"), the drive lever ("Lever, shutter drive"), the shutter ("Shutter, slip"), the holder plate ("Holding plate, slip"), the open / close cam ("Cam, form stopper O / C"), the open / close form stopper cam (Cam, form stopper O / C), the open / close slip lever ("Lever, slip O / C"), the open / close stopper lever ("Lever, form stopper O / C"), and the front holder rollers (“Rollers, slip, hold, front”).

The holder plate is installed at the end of the shutter. The plate uses two springs ("Spring, slip holding plate, R" and "Spring, slip holding plate, L") to press the paper against the platen ("Platen, paper guide").

The end of the shutter guide shaft ("Shaft, shutter guide," attached to the shutter) fits into a slit on the shutter frame ("Frame, shutter") and can slide parallel to the platen. The right and left shutter shafts ("Shaft, shutter, L" and "Shaft, shutter, R") fit into the diagonal slits on the corresponding ends of the drive lever ("Lever, shutter drive").

The drive lever and the slider ("Slider, shutter") can move left and right along the shutter lever shaft ("Shaft, shutter lever"). The shutter drive shaft ("Shaft, shutter drive"), mounted on the slider, fits into the spiral groove on the shutter drive cam ("Cam, shutter drive").

When the shutter motor ("Motor, shutter") is turned in the direction A1 (see Fig. 2-22) from the home position of the shutter, the rotation of the shutter drive cam causes the slider and the drive lever to move in the direction A2. The shutter itself moves upward, as it is lifted along the slope of the slit on the shutter-drive lever.

The gear on the other side of the shutter drive cam engages and drives the slip open / close cam ("Cam, slip O / C") and the form stopper open / close cam ("Cam, form stopper O / C"). The slip open / close cam turns at one second of the rate of the shutter drive cam.

Because the three cams rotate in phase, rotating the shutter motor some specified number of turns (starting from home position) can select the sutter mechanism, the open / close state of both the front feed roller and the form stopper.

The shutter detection mechanism can be used to detect abnormal shutter operation and to adjust the home position at time of shutter initialization.

The user can control the shutter mechanism manually by turning the shutter reduction gear ("Gear, shutter reduction") at the point where it projects outward from the carriage frame.

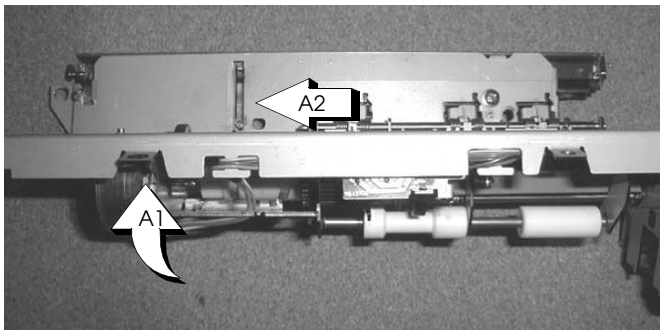


Figure 2-22 Shutter mechanism home position

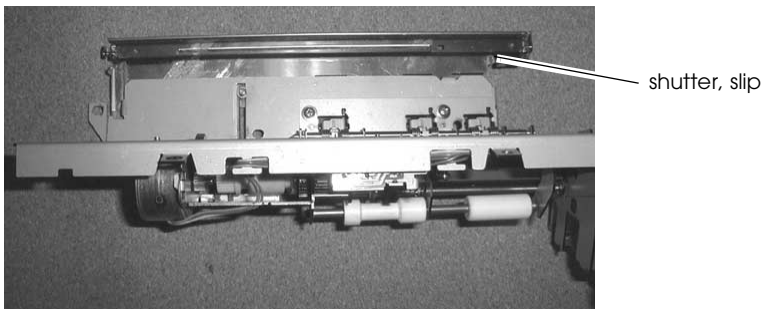


Figure 2-23 Shutter mechanism paper-insertion position

Shutter-mechanism timing chart, and slip insertion operation

Figure 2-24 shows the timing chart. Operation begins by initializing the shutter mechanism, and placing it in standby state at home position. The mechanism is in lowered position, the front slip-holder rollers ("Roller, slip hold, front") are open, and the form stopper is blocking the paper path (so that it is possible to set the slip into position).

Slip insertion

To insert the paper, the shutter mechanism and slip feed mechanism operate as follows:

Step 1

When a slip is inserted, the T.O.F. and B.O.F detectors both detect the insertion of the slip. This causes the shutter motor ("Motor, shutter") to rotate in the CW direction and stops at the phase point indicated as T1 in the timing chart. At this point, the front slip-holder rollers are closed and the form stopper is no longer blocking the paper path. The paper feed motor now starts rotating, and loading the sheet. When the edge of the slip passes center slip feed rollers ("Roller, slip feed, center"), the paper-feed motor stops.

Step 2

The shutter motor now turns in the CCW direction, returning the shutter mechanism to home position. The paper-feed motor then starts again, feeding the leading edge of the paper to the point where it is just about to reach the top slip holder guide ("Paper guide, slip hold, top").

Step 3

The shutter mechanism reaches the phase point indicated as T2 in the timing chart. At this point the shutter has risen almost to the level of the slip holder paper guide, and the slip holder plate ("Holder plate, slip") is pressing the end of the slip against the platen so that it does not come loose. Further feeding of the sheet advances it all the way to the top slip holder guide.

The shutter mechanism is returned to the home position; then printing begins.

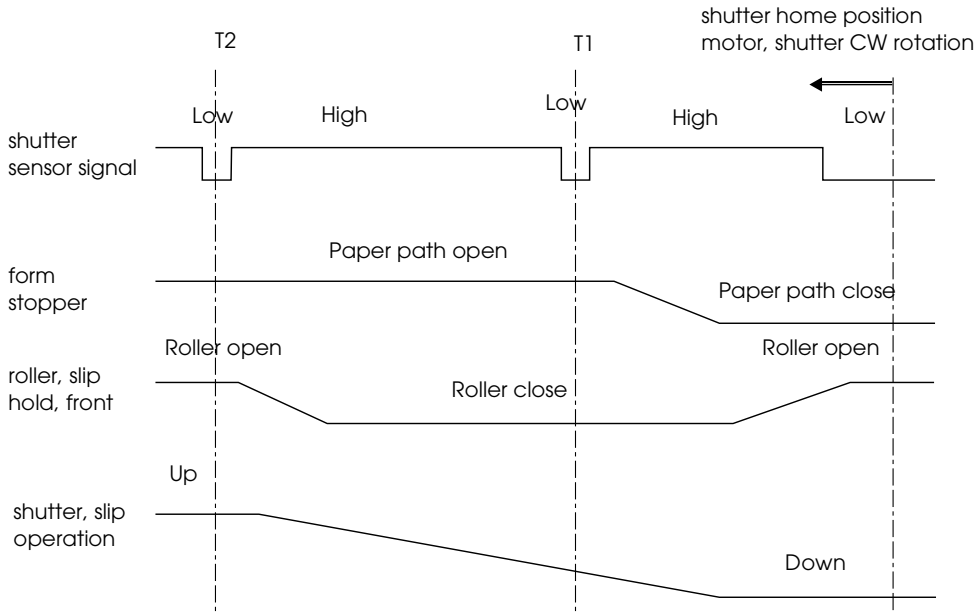


Figure 2-24 Shutter mechanism timing chart

Detector mechanisms

The M-J8000 includes the following detector mechanisms.

Home-position detector mechanism	Detects home position of the head carriage ass'y.
Carriage detector mechanism	Detects errors in head-carriage operation.
Pump position detector mechanism	Detects home position of the pump roller.
Ink-near-end detector mechanism	Detects presence of ink in the ink cartridge.
Cartridge detector mechanism	Detects presence of the ink cartridge.

T.O.F. detector mechanism	Detects presence of a slip.
Paper-width detector mechanism	Detects presence of a slip.
B.O.F. detector mechanism	Detects presence of a slip.
Slip detector mechanism	Detects presence of a slip.
Shutter detector mechanism	Detects home position of shutter.
Roll paper detector mechanism	Detects presence of roll paper.
Roll paper near-end detector mechanism	Detects presence of roll paper.
Cover-open detector mechanism	Detect state of the roll paper cover.
Cutter detector mechanisms	Detects home positioning of the cutter mechanism.

Home-position detector mechanism

This mechanism is installed at the right end of the head carriage assembly stroke range. The mechanism detects the carriage assembly's position as well as errors in the carriage operation. The detector detects the detection plate located on the rear of the carriage assembly as default.

The detector consists of an LED and a photo IC. When the carriage assembly moves, the detector plate pass through between the LED and the photo IC. Since the optical axis is blocked at this time, the level of the IC output will be changed. The change in IC output serves as the detection signal of the moving position of the carriage assembly.

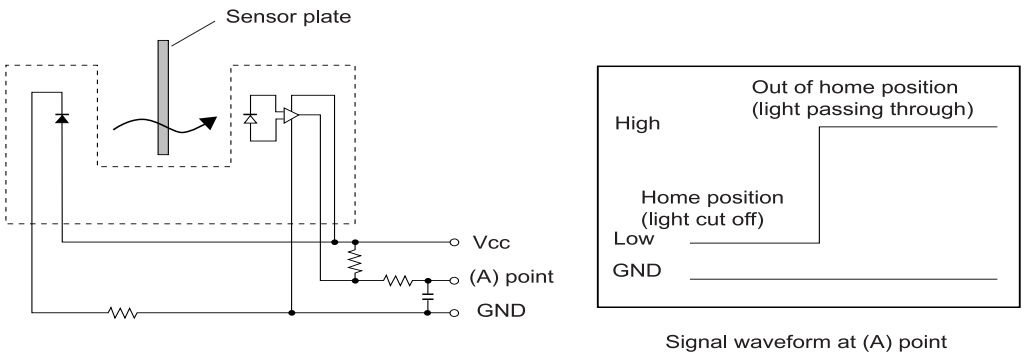


Figure 2-25 Home position detector

Carriage detector mechanism

This mechanisms uses a rotary encoder mounted directly on the rotating shaft of the carriage motor ("Motor, carriage") to detect errors in motor rotation. The mechanism consists of a detector plate ("Detector plate, carriage") and a carriage detector.

The carriage detector consists of an LED and a photo IC. The circular detection plate, which looks like a wagon wheel, has 12 evenly spaced plate which blocks the light along the circumference of the detection plate, and there are open spaces in between. The detector plate is mounted directly on the rotating shaft of the carriage motor. Rotation of the carriage motor therefore causes the plate to turn as well. The turning of the plate alternately blocks and opens the passage of light from the LED to the photo IC, causing changes in the output level from the IC. Detection is made by monitoring the changes in the output level.

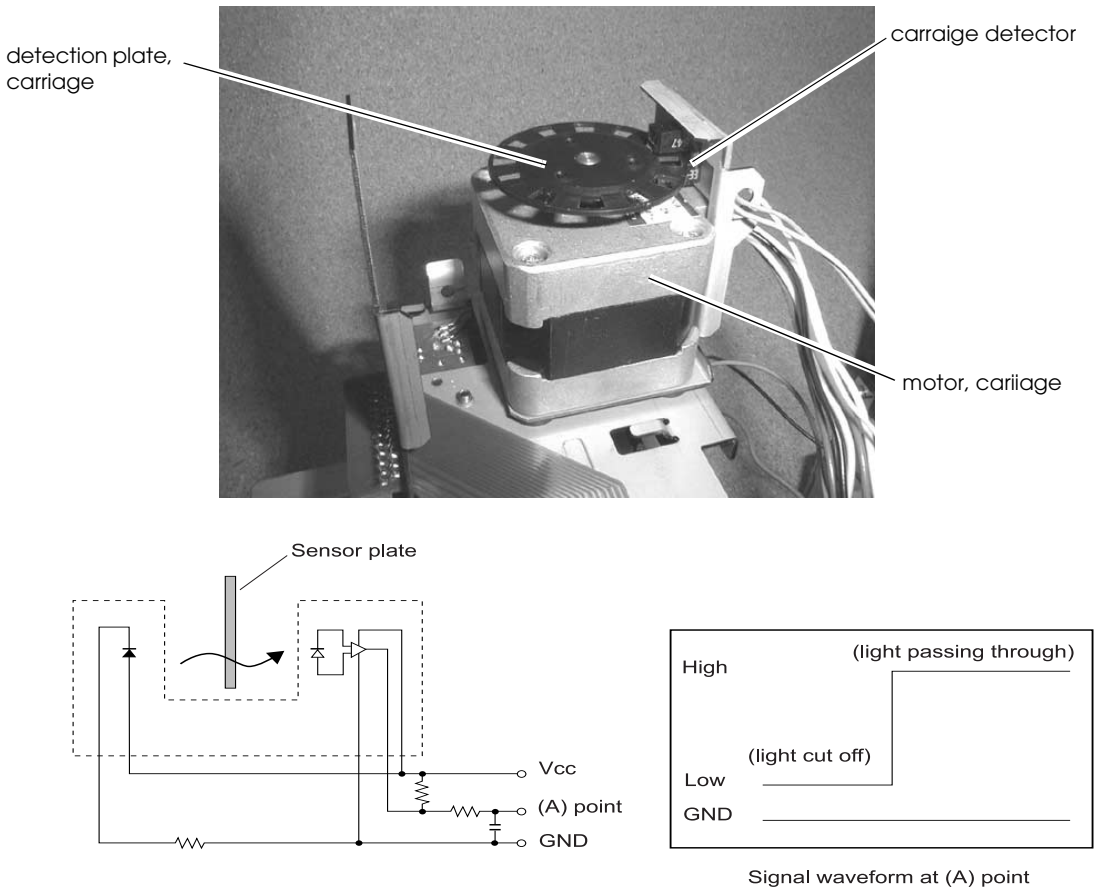


Figure 2-26 Carriage detector mechanism

Pump position detector mechanism

This mechanism detects the roller position. The mechanism consists of a pump-position detector plate (linked to a pressure pulley) and a pump-position detector.

The pump-position detector consists of an LED and a photo IC. The detector plate, which includes a cutout area, fits between the LED and the photo IC and is turned by the power of the pump motor.

When the cutout area moves into this area it allows light to pass from the LED to the IC, causing a change in the IC output which services to detect the roller position

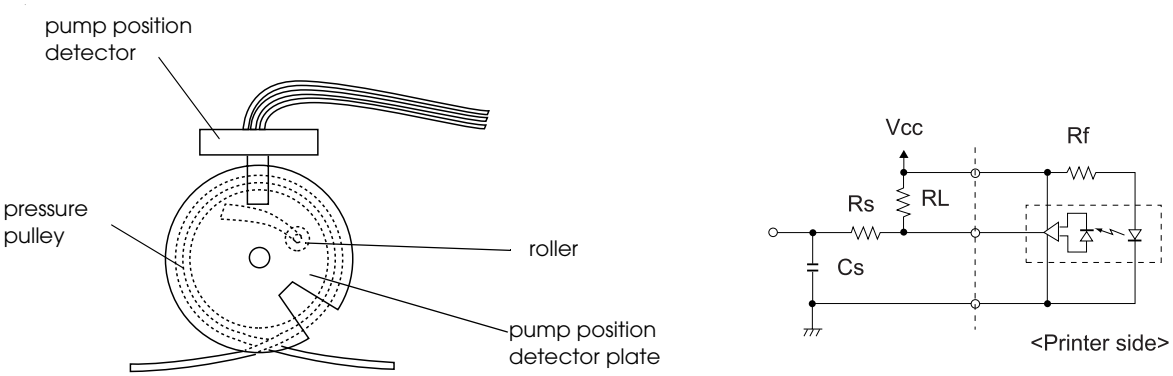


Figure 2-27 Pump position detector mechanism

Ink nearend detector mechanism

The ink nearend detector is mounted on the cartridge guide unit, and monitors the ink level in the installed ink cartridge.

Detection is by mechanical contact. The contact remains open so long as the cartridge contains a sufficient level of ink. When the ink level runs low, the detector plate mounted on the cartridge presses on the detector's actuator, causing the contact to close.

When the detector detects that ink has run out, it resets the ink usage counter. Ink-end will occur when ink usage reaches the specified value

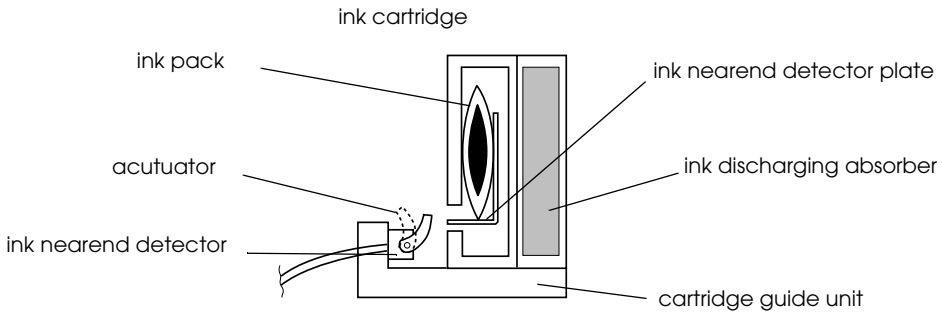


Figure 2-28 Ink nearend detector mechanism

Cartridge detector mechanism

The cartridge detector, mounted on the cartridge guide unit, detects whether the cartridge is installed, and whether it is installed correctly.

Detection is by mechanical contact. The contact is closed if there is no ink cartridge in place. When the ink cartridge is installed correctly in place, the side of the cartridge presses against the actuator on the detector, causing the contact to open.

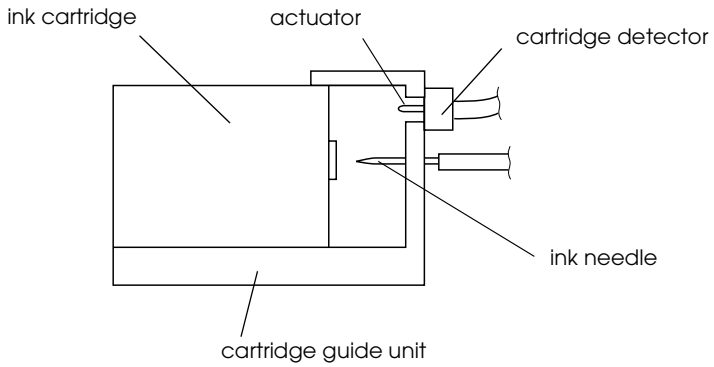


Figure 2-29 Cartridge detector mechanism

T.O.F. detector mechanism

This mechanism is mounted just in front of the form stopper to confirm that a newly inserted slip has moved all the way up to the form stopper correctly.

The detector consists of an LED and a phototransistor. When a slip moves into place, light from the LED reflects from the slip back to the phototransistor. The phototransistor output changes accordingly, indicating that the sheet is in position.

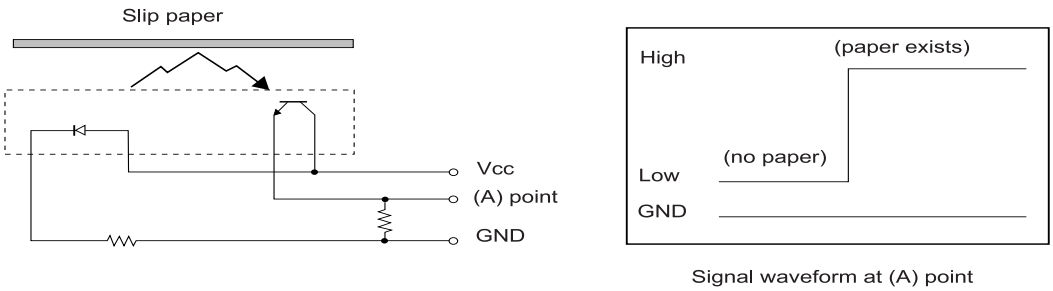


Figure 2-30 T.O.F. detection circuit

Paper-width detector

This detector detects the width of the inserted slip. The detector is mounted approximately 122mm from the right edge of the paper path. If the slip is wider than 122mm, the detector will detect its presence.

In most cases checks are narrower than 122mm when fed vertically, but wider when fed horizontally. In cases where the user wishes to feed checks horizontally, the detector helps protect against accidental insertion of such checks in the vertical direction: if the check is inserted vertically, the detector will not detect it.

The detector consists of an LED and a phototransistor. When a slip moves over the detector area, LED reflects from the slip back to the phototransistor. The phototransistor output changes accordingly, indicating that the sheet exists at that position.

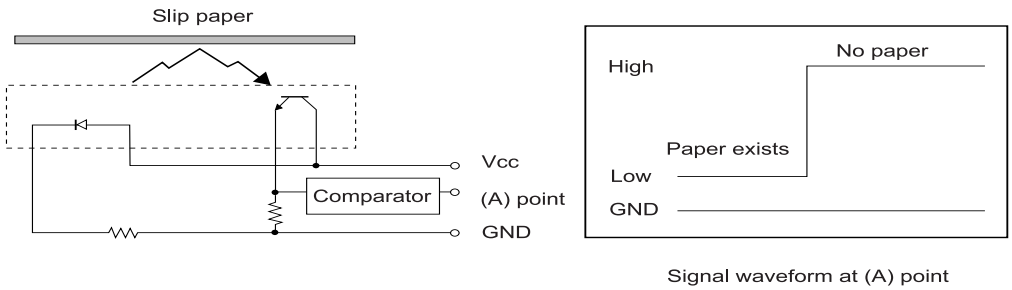


Figure 2-31 Paper-width detector circuit

B.O.F. detector mechanism

This mechanism is used to determine slip presence (when the slip is inserted) and the bottom of the form (bottom end of the sheet). The detector is located near the right edge of the paper path, to confirm that the sheet is aligned with the right side of the path.

The detector consists of an LED and a phototransistor. When a slip moves into place, light from the LED reflects from the slip back to the phototransistor. The phototransistor output changes accordingly, indicating that the sheet is in position.

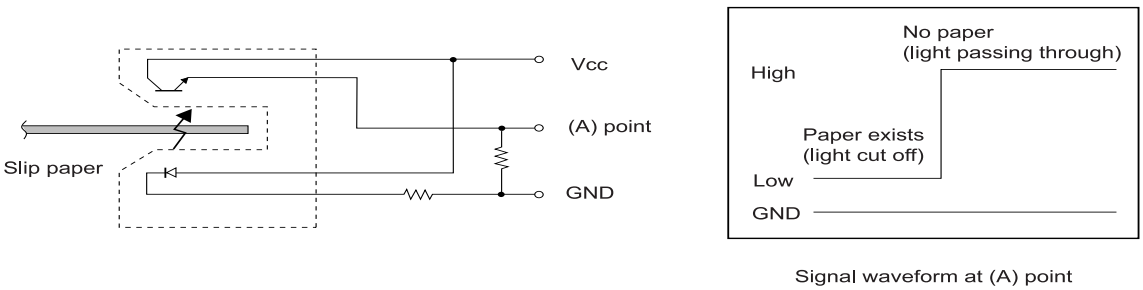


Figure 2-32 B.O.F. detection circuit

Slip detector mechanism

This mechanism is located just before the print position to confirm that the slip has advanced to the print position. By ensuring that the slip has reached the print area correctly, the mechanism helps prevent printing without a slip paper.

The detector mechanism consists of a slip detection lever ("Lever, slip detection"), an LED, and a photo IC. When the sheet moves into position, it pushes the lever in direction A (see Figure). The other end of the lever moves between the LED and the photo IC, blocking the light flow. This changes the IC output level, indicating that paper is present.

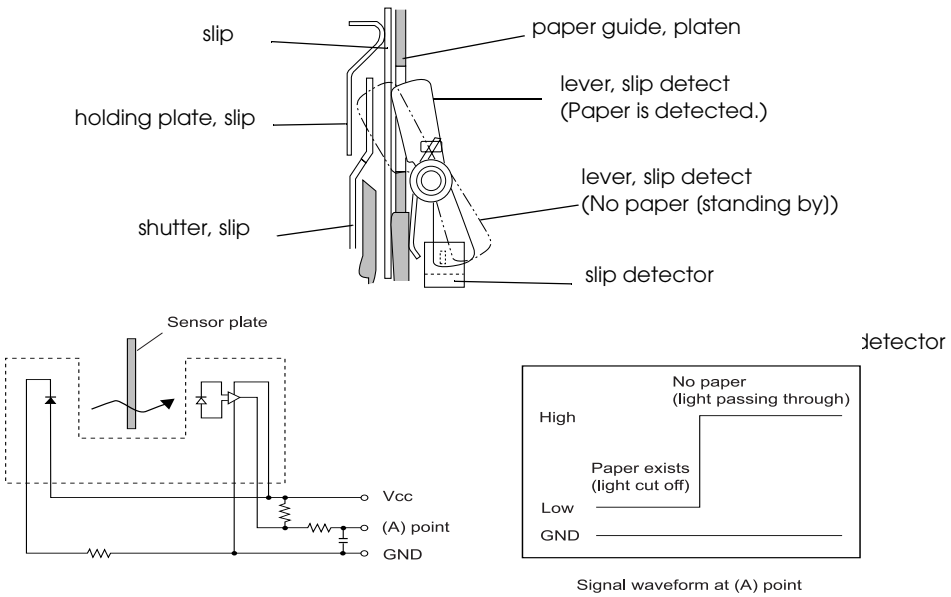


Figure 2-33 Slip detector mechanism

Shutter detector mechanism

This detector confirms that the shutter moves into home position (at initialization) and detects errors during the shutter operation. The detector mechanism is mounted around the circumference of the slip open / close cam ("Cam, slip O / C") inside the shutter frame ("Frame, shutter").

The detector mechanism consists of an LED and a photo IC, and works in conjunction with blocker areas on the cam. As the cam turns, the blocker areas moves in and out of the space between the LED and the photo IC, alternately blocking and opening the light path and thereby changing the IC output level. Operation is based on the fact that the cam moves in sync with the shutter mechanism. There are only three phase positions (including home position) at which the shutter mechanism stops. The blocker forms are fitted so that they move into the detector (and block the light path) only when the shutter is located at the phase position.

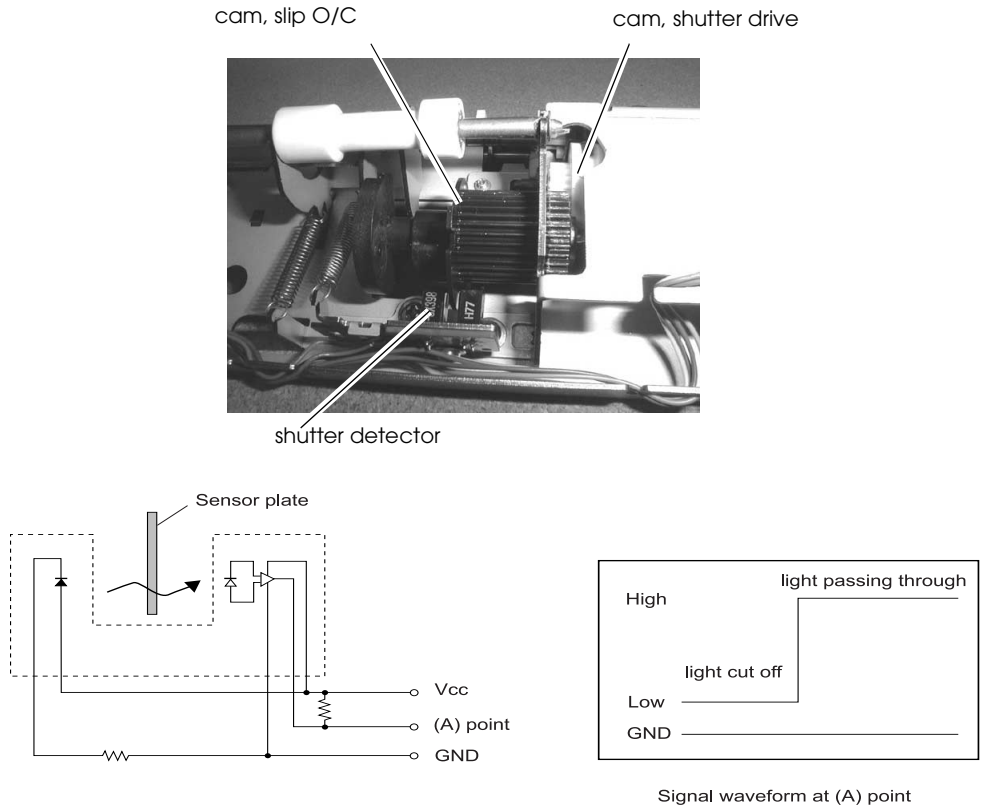


Figure 2-34 Shutter detector mechanism

Roll paper detector mechanism

This mechanism consists of a roll paper detector combined with a microswitch and a detection lever, and is mounted on the roll paper guide ("Paper guide, roll paper"). The mechanism detects the presence of roll paper within the paper path.

A spring within the microswitch holds the lever so that it juts out into the paper path. When roll paper moves along the path, it presses the lever back out of the path, causing the microswitch contact to open. When paper runs out, the spring pulls the lever back into position, closing the contact on the microswitch.

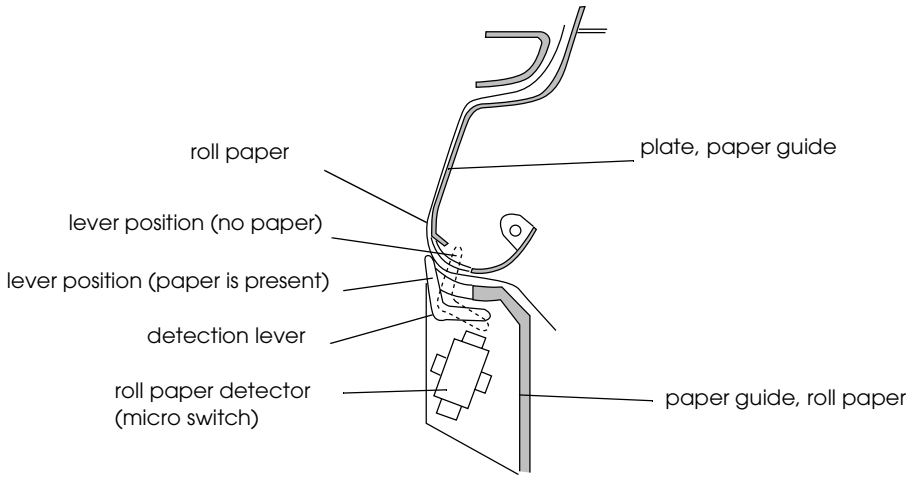


Figure 2-35 Roll paper detector mechanism

Roll paper nearend detector mechanism

This mechanism consists of a nearend detector lever and a microswitch. The mechanism is mounted on the side of the roll paper guide ("Paper guide, roll paper"), and serves to detect the amount of paper remaining on the roll.

A spring inside of the microswitch presses the lever against the side of the paper roll. As long as there is sufficient paper on the roll, the lever keeps the microswitch contact closed. As paper runs out, the edge of the lever moves into the paper core. In this state, the microswitch contact is open and detects paper-out.

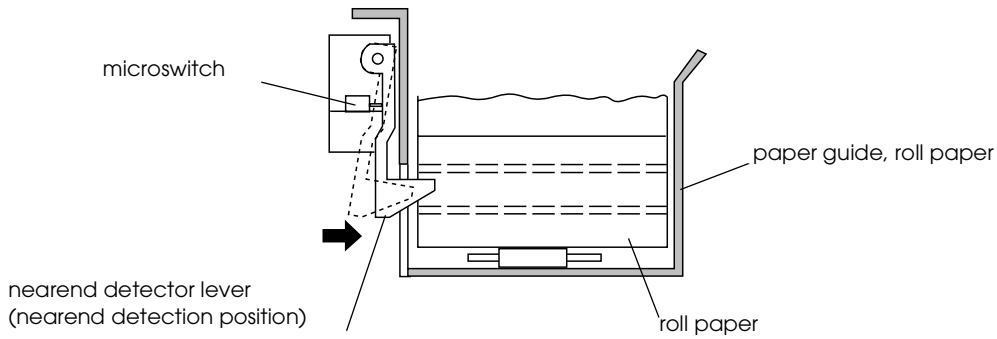


Figure 2-36 Roll paper nearend detector mechanism

Cover-open detector mechanism

This mechanism consists of lock lever ("Lever, CS lock") located on the roll paper cover, and a detection lever ("Lever, cover-open detect") and cover-open detector located on the gear-train frame assembly on the paper roll side. The mechanism detects the open / close state of the cover.

The cover-open detector consists of an LED and a phototransistor. When the cover is closed, the lock lever rotates the detection lever such that the blocker plate on the other end of the detection lever moves between the LED and phototransistor, blocking the light flow and changing the IC output. The change in IC output detects the open / closed state.

When the printer detects that the cover is open, it immediately goes offline and stops operating.

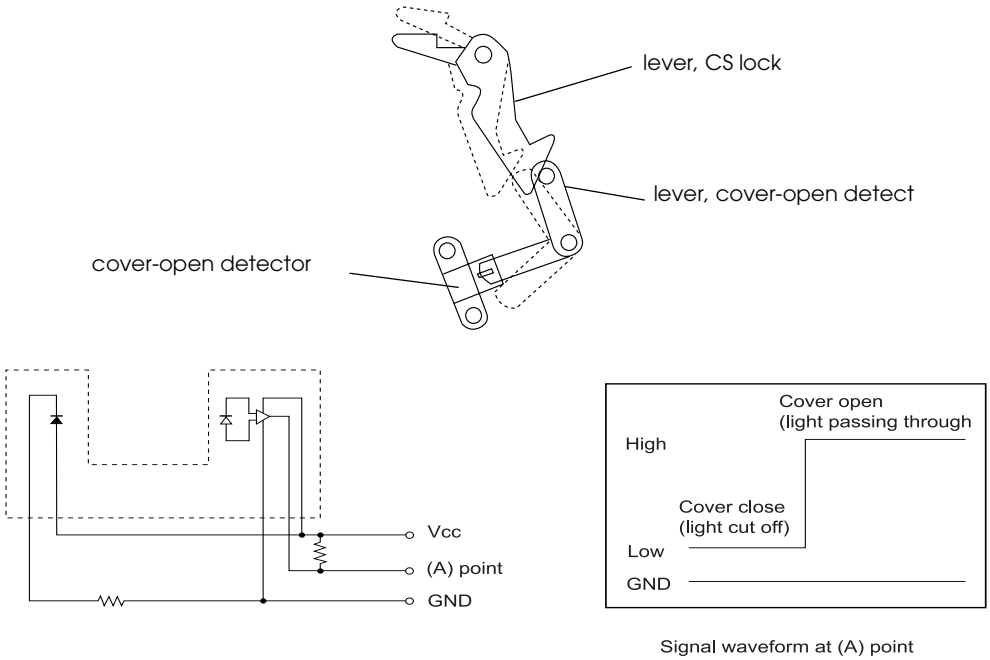


Figure 2-37 Cover-open detector mechanism

Cutter detector mechanism

This mechanism consists of two cutter detectors (one at left, indicated as "L", and the other at right, "R"), and a cutter carriage sub-assembly (which includes a blocker plate).

Each cutter detector consists of an LED and a photo IC. The detector outputs HIGH when the blocker plate is blocking the light flow, and LOW when the light path is open. When the cutter carriage sub-assembly is in standby at home position on either the L or R side, the detector on that side will be generating a HIGH, while the detector on the other side will output a LOW. When cutter operation begins (when a cutter command causes the cutter motor to begin turning), the cutter moves out of home position, causing the blocker to move out of the detector, so that L / R detectors will be outputting LOW. When the cutter completes operation and reaches home position on the other side, the blocker will enter the detector at that side and the signal at that side will go HIGH.

The printer uses these signals to control stopping of the cutter motor and to detect errors related to the cutter mechanism.

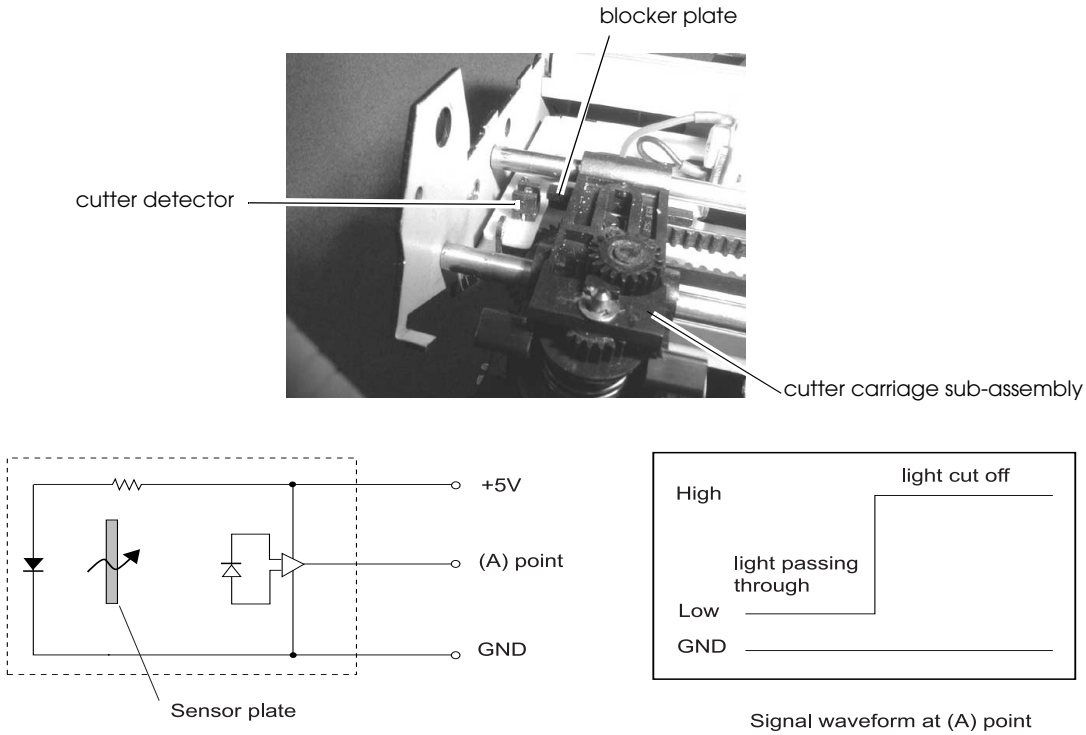


Figure 2-38 Cutter detector mechanism

Autocutter mechanism

The autocutter mechanism consists of a transmission mechanism, a detection mechanism, and a cutter mechanism. For information about the detection mechanism, refer to "Cutter detection mechanism" in this chapter.

Transmission mechanism

This mechanisms consists of the following components: cutter-motor gear ("Gear, motor AC") mounted on the shaft of the cutter motor ("Motor, AC"); reduction gear ("Gear, reduction AC "), transmission gear ("Gear, transmission AC"), a pair of pulleys ("Pulleys, belt drive AC"), a belt ("Belt, carriage AC"); and the carriage drive shaft ("Shaft, carriage drive"), which is fixed to the belt.

The rotation speed from the cutter motor passes from the cutter-motor gear through the reduction and transmit gears (which reduce the speed) to the drive pulley. The rotation power of the gears move the pulley and the belt; then it moves the carriage drive shaft.

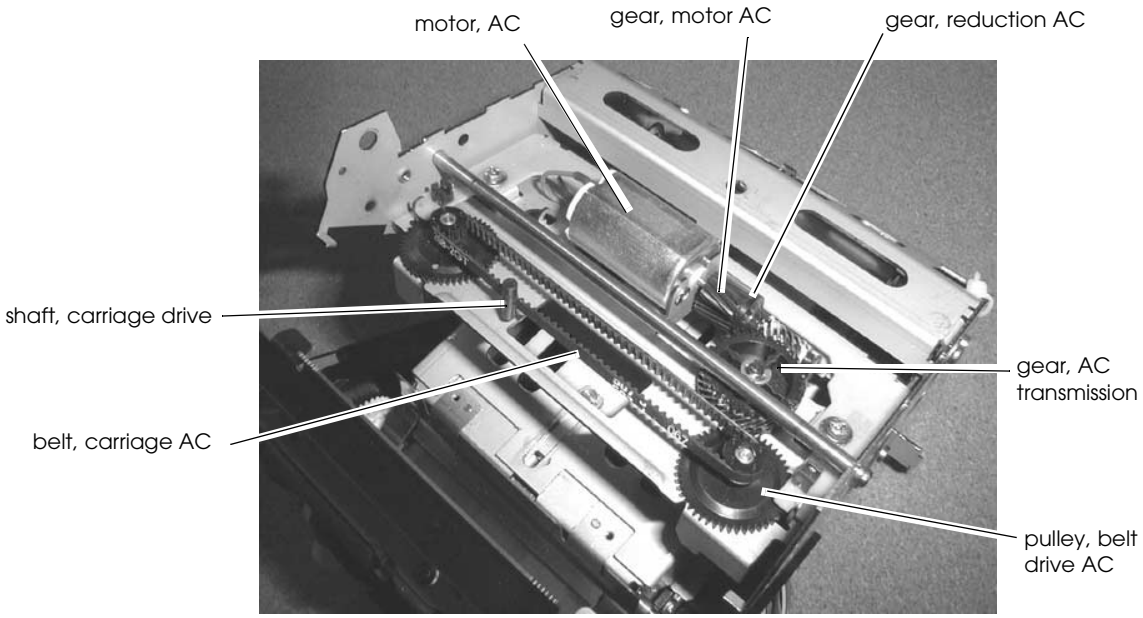


Figure 2-39 Autocutter transmittion mechanism

Cutter mechanism

This mechanism is comprised of a cutter carriage sub-assembly, the circular cutting blade sub-assembly, a holding spring ("Spring, CCB hold"), three gears ("Gear, CCB driving," "Gear, CCB transmission," and "Gear, AC rack"), and a fixed blade (Linear cutting blade). The circular cutting blade sub-assembly, which is mounted in the cutter carriage sub-assembly, is pressed against the fixed blade by the force of the holding spring.

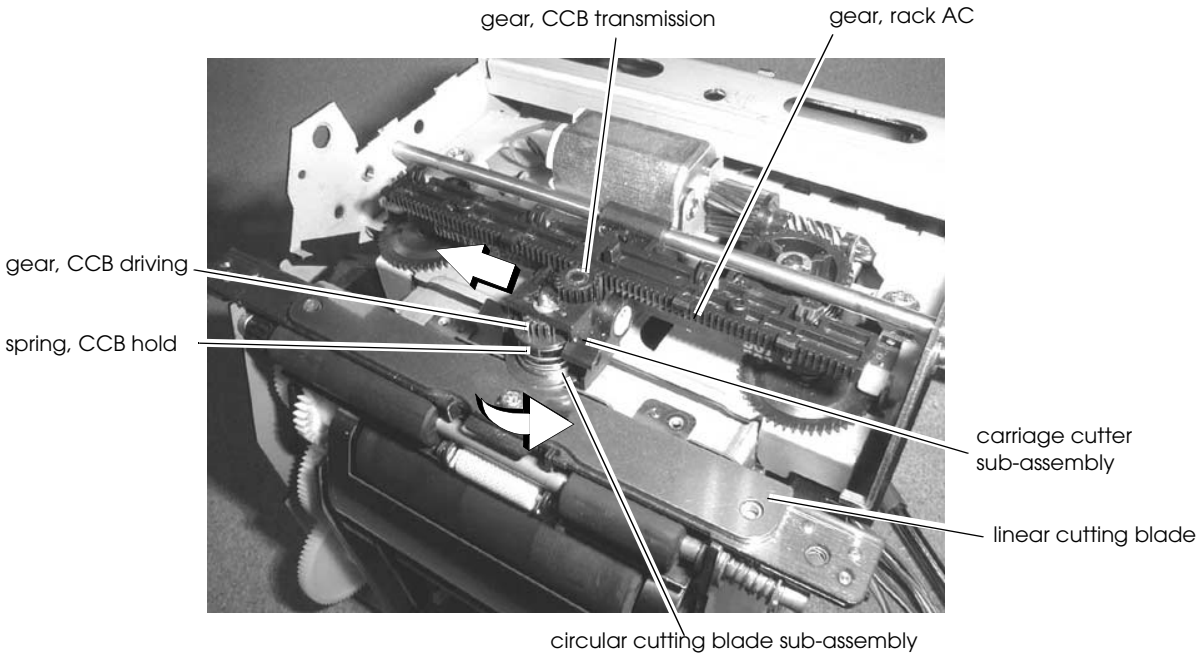


Figure 2-40 Cutter mechanism

Cutting operation

When the cutter carriage sub-assembly starts from home position at either the right (R) or left (L) side, the motor is activated so that it rotates in the direction of the arrow (see illustration); the rotation force passes into the transmission mechanism, causing the cutter carriage sub-assembly which is engaged the carriage drive shaft to move in the direction of the arrow. The resulting rotation of the gear, AC rack and the gear, CCB transmission causes the gear, CCB driving to turn, so that the circular cutting blade sub-assembly also turns in the direction of the arrow,

catching and cutting the paper. The cutter carriage sub-assembly then reaches home position on the side opposite from which it started, causing the detection mechanism to output a HIGH signal. The system responds by stopping the cutter motor, completing the sequence.

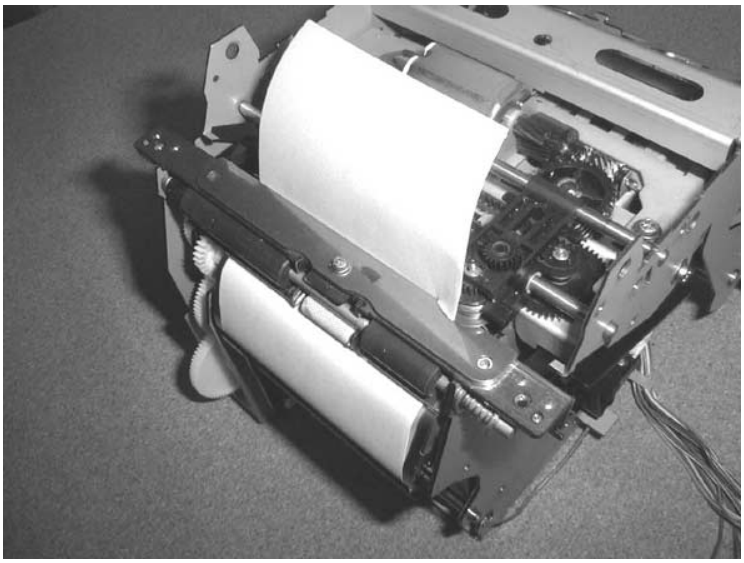


Figure 2-41 Cutting operation

Ink system mechanism

The ink system mechanism consists of the following three mechanisms.

- ❑ Pump mechanism
- ❑ Capping mechanism
- ❑ Wiping / carriage-lock mechanism

The following is a block diagram of the ink system.

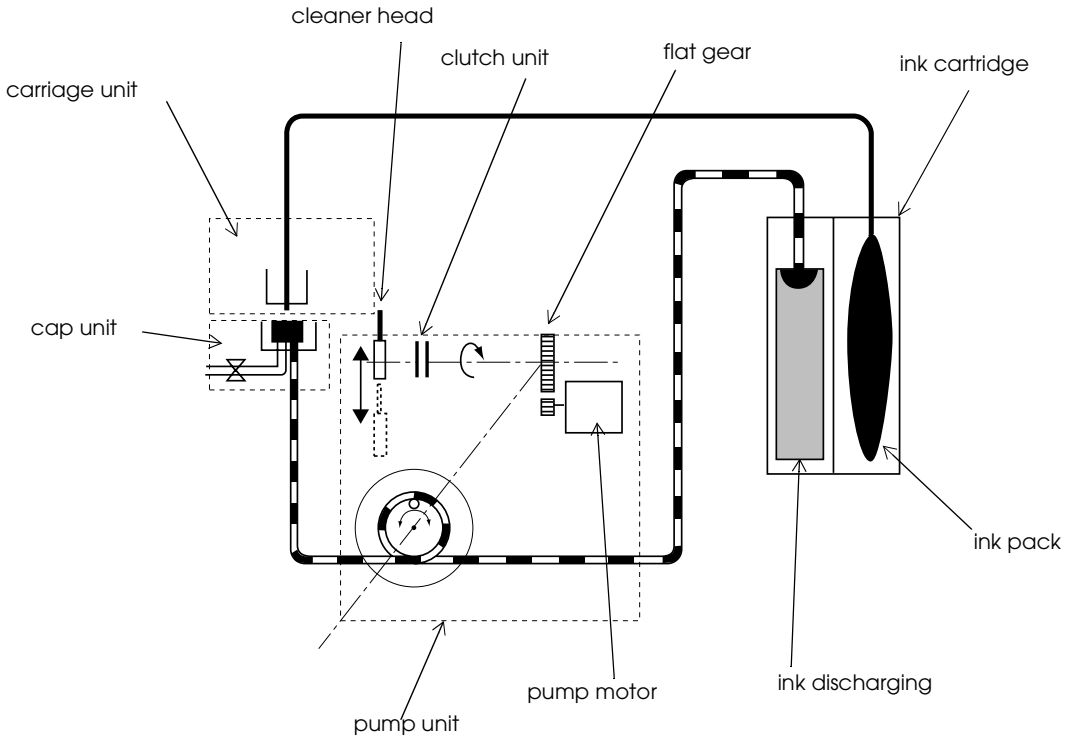


Figure 2-42 Ink system block diagram

Pumping mechanism

This mechanism comprises the pump motor and the pump unit. The mechanism sucks accumulating ink from the nozzles in the print head, and passes it through the cap section into the ink discharge absorber inside the ink cartridge.

The pump consists of a roller, a tube, and a pressure pulley (see illustration below). To collect ink, the motor turns the pulley, causing the roller to press against and move around the tube. This action changes the internal capacity of the tube, creating a vacuum force pressure that sucks in the ink and ejects it into the ink cartridge.

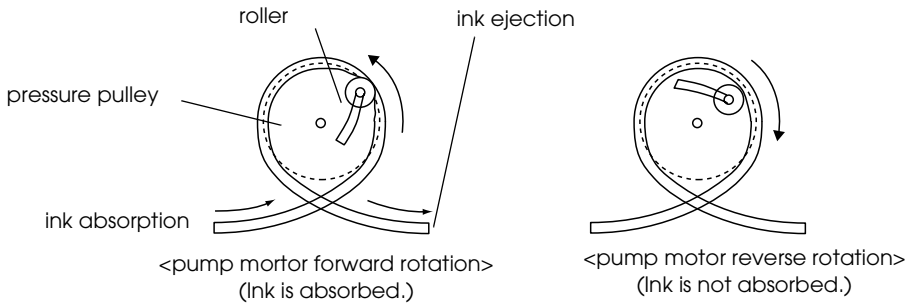


Figure 2-43 Pump mechanism

Capping mechanism

This mechanism prevents ink from drying and accumulating in the nozzle area during periods when the printer is off or not printing. Exposure of the head nozzle to the air would tend to cause the surface ink to stick because of drying. This capping mechanism covers the print head with a cap holder to protect it from exposure.

The capping operation starts with the carriage unit in standby position, on the left of the head; then the carriage unit moves to the right, toward its home position. As it approaches home position, it engages the cap holder and moves it such that it covers the print head. The action ends with the carriage unit in the home position and the cap holder covering the print head.

The front power switch (on the front panel) is installed on the secondary side of the printer's power circuit, so that power continues to exist for a certain interval after the front power switch is set to off. If the user turns the power off while the head is uncapped, the capping mechanism can complete capping in the interval before the power goes out.

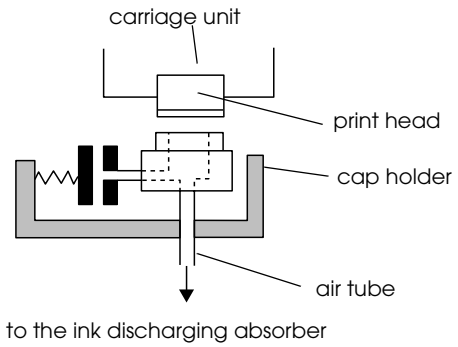


Figure 2-44 Capping mechanism

Wiping/carriage-lock mechanism

The wiping mechanism wipes ink and dust off the surface of the nozzles, and is therefore a part of the head-cleaning process.

Forward rotation of the pump motor acts on the pump gear, causing the clutch plate to move. The motion of the clutch causes the cleaner head to advance into the motion path of the print head. When the carriage unit carries the print head to the left or right, the nozzles brush against the protruding cleaner head so that ink and dirt are wiped away. Reversing the rotation of the pump motor causes the cleaner head to retract, so that it is no longer in the print-head path.

The carriage-lock mechanism prevents the carriage unit and cap from coming loose during printer transport. The mechanism is also an extension of the wiping mechanism described above. To execute locking, the pump motor runs in the forward direction while the carriage unit is stationary at home position; this motor rotation moves the lock lever (though the movement of the cleaner head) so that the edge of the lever engages the pin on the carriage, locking the carriage unit in place. To unlock the carriage unit, the pump motor runs in reverse so that the lock lever comes free of the pin.

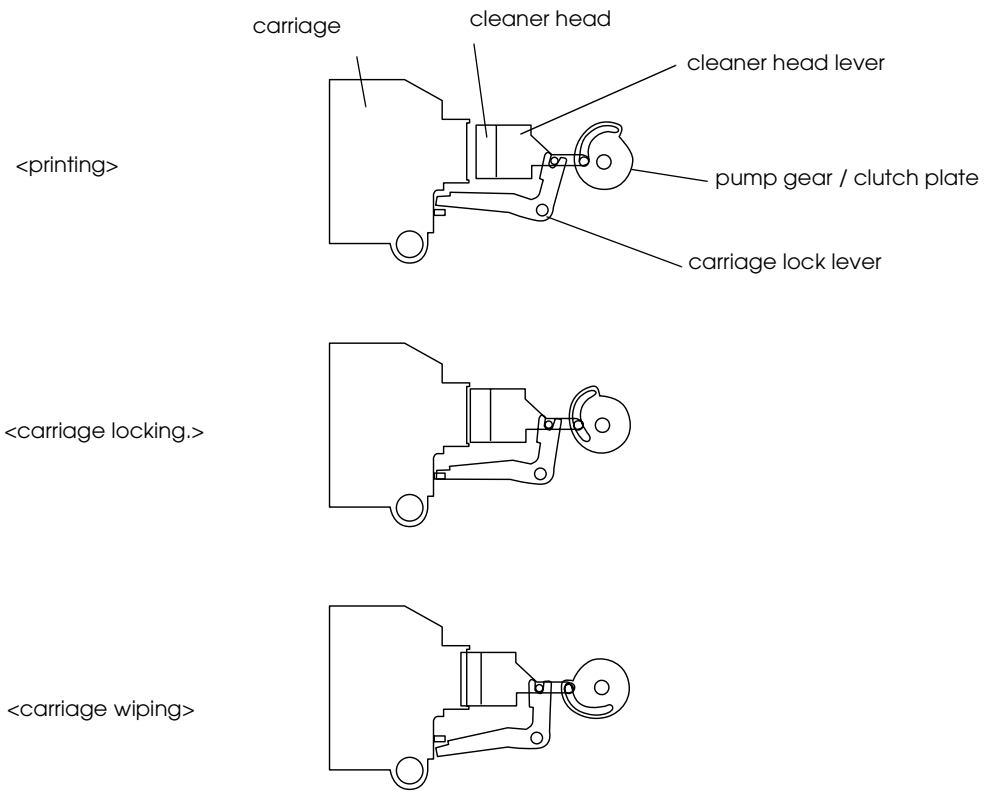


Figure 2-45 Wiping/carriage-lock mechanism (cross section drawing)

Overview of electrical circuit

The following is a block diagram of the TM-J8000 electrical circuit.

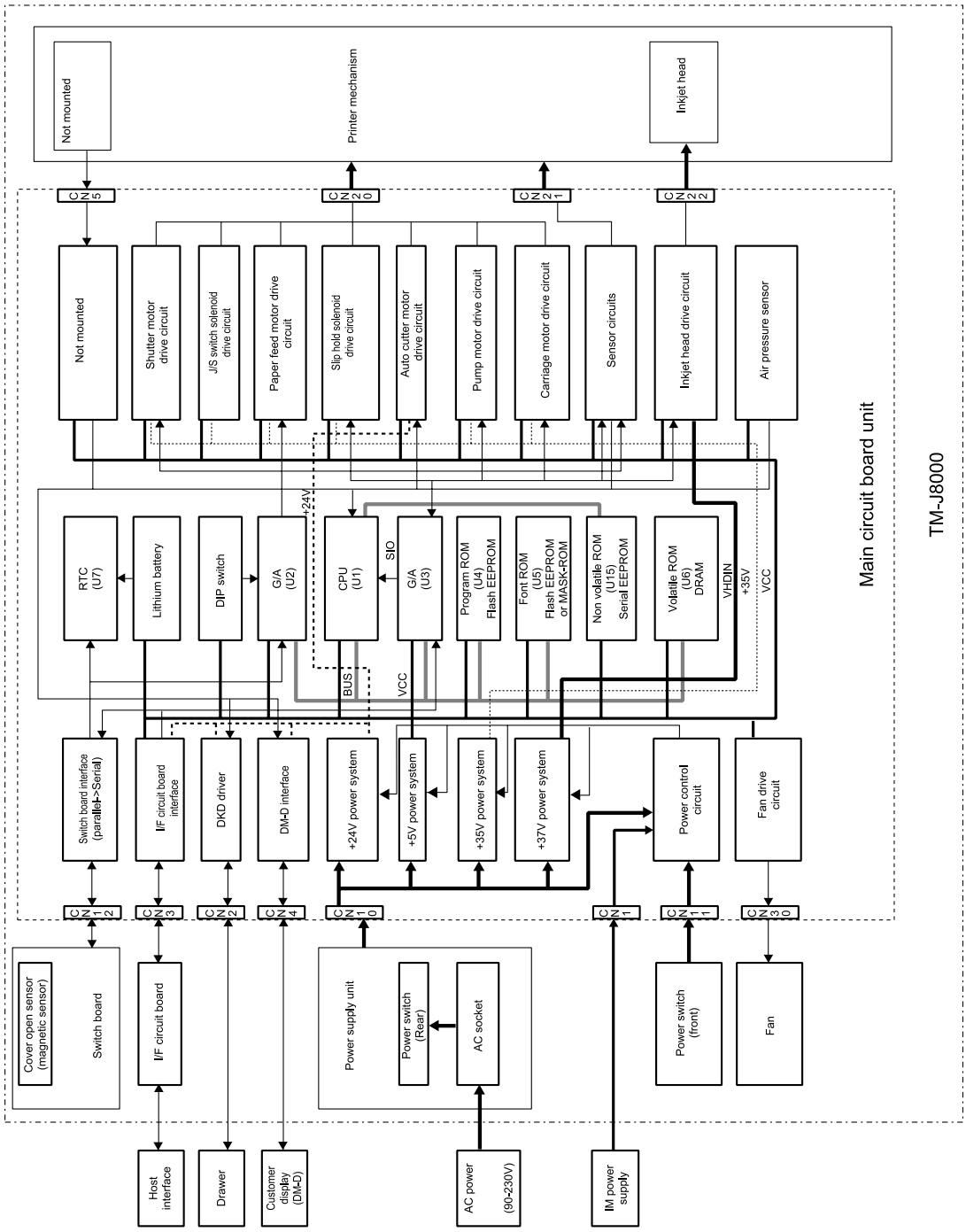


Figure 2-46 Block diagram of electrical circuit

Main-board Unit

The main-board unit carries out the major part of TM-J8000 control. The unit includes the CPU / memory control circuit, the mechanism drive circuit, the detection circuit, and the power control circuit.

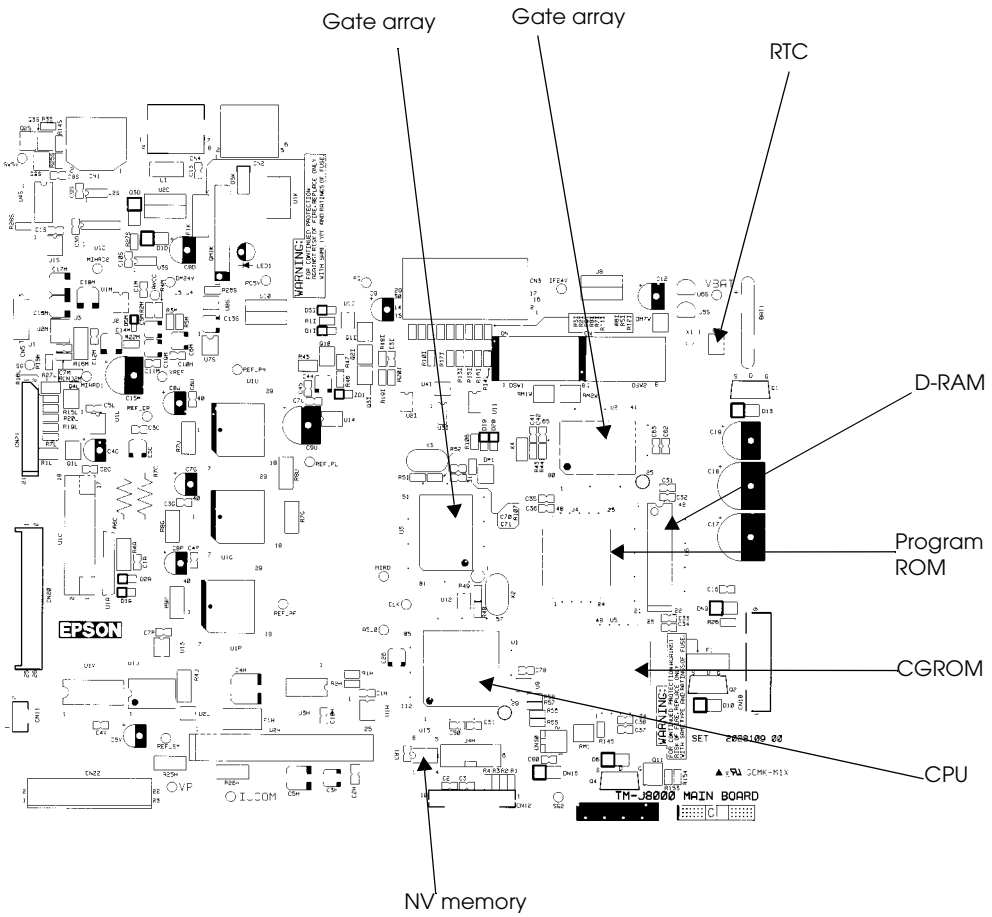


Figure 2-47 Location of principal elements on the Main circuit board unit

The following table describes the function of each of the principal elements on the main board unit.

Table2-1 Major components and functions

Block	Location	Signals on diagram	Description	Main Operation
CPU peripheral area	U1	–	–	CPU, I/O port
	U2	–	Custom gate array	I/O port (dip-switch, RTC, mechanism control, etc.)
	U3	–	Custom gate array	I/O port (CPU clock supply, SIO, mechanism control, etc.)
	U4	–	8Mbit (512K * 16 bits)	Program memory
	U5	–	16Mbit (2048K * 8 bits)	Font memory
	U15	–	256Kbit (32K * 8 bits; serial I/O)	NV memory
	U6	–	16Mbit (1024K * 16 bits)	D-RAM
	U7	RTC	–	RTC
	X1	–	32.788KHz	RTC clock
	X2	–	14MHz	System clock (for U3)
	X3	–	10MHz	System clock (for U3)
	X4	–	1MHz	System clock (for U2)
	U11	nRESET	–	System reset
	U2I	–	–	Host-interface reset control
Power-related	F1	154002	2A	Fuse for mechanism power
	F1H	–	–	PTC thermistor, for inkjet-head power
	U2	DM24V	DC24V, 400mA	For customer-display power
	U8	IF24V	DC24V, 100mA	Power for UIB (Universal Interface Board)
	U10	+24V	DC24V, 0.25A	Power for autocutter
	Q4	+35V	DC35V, 1.2A	Semiconductor switch for mechanism power supply
	Q1	VCC	DC5V, 0.7A	Power semiconductor switch for control circuit
	Q11	VHDIN	DC37V, 0.02A	Power semiconductor switch for ink jet head
	U2M	–	DC15V, 0.01A	Not used
	U1K	DKP	DC24V, 1A	Power for drawer
	U5S	–	DC6V, 0.1A	Power for power-switch (front of printer)control circuit
	U6S	PC5V	DC5V, 0.1A	Power for power-switch (front of printer)control circuit
	U7S	–	–	Power (VCC) time-limit energizing timer for control circuit

Block	Location	Signals on diagram	Description	Main Operation
Connectors	CN1	IM	–	IM-system power connector (power interlock detect)
	CN2	DKD	–	Drawer connector
	CN3	I/F BOARD	–	UIB (Universal Interface Board) connector
	CN4	DM	–	Customer display connector
	CN5	–	–	Not used
	CN10	PS	–	Power-unit connector
	CN11	PSW	–	Power-switch connector (front of printer)
	CN12	PANEL	–	Panel circuit board connector
	CN20	–	–	Mechanism connector
	CN21	–	–	Mechanism connector
	CN22	IJ CON.	–	Ink jet head connector
	CN30	FAN	–	Fan connector
Interface	U1	–	–	RS-232C conversion IC (for customer display)
	QM1K	DKD1, DKD2	DC24V, 1A	Drive transistor and output signal for, drawer
Not used	U1M	MIRD	Standard: 2.5V, 2.2P-P	Not used
Mechanism-related driver	U1A	ACM+, ACM-	DC24V, 0.25A	Push-pull driver and output signal, for cutter motor
	U1C	MT_A, MT_B, MT_C, MT_D	DC35V, 0.7A	PWM-current-control-type unipolar steping motor driver and output signal, for carriage drive
	U1G	SLIP_PL-, SLIP_PL-, MICR_PL+, MICR_PL-	DC35V, 1.17A/ 0.39A	Push-pull driver and output signal, for slip-holder solenoid
	U1J	JS_PL+, JS_PL-	DC35V, 0.85A/ 0.175A	Push-pull driver and output signal, for journal/slip switching solenoid
	U1P	PF_A+, PF_A-, PF_B+, PF_B-	DC35V, 0.6A	PWM-current-control-type bipolar steping motor driver and output signal, for paper feed
	U1U	PM_A+, PM_A-, PM_B+, PM_B-	DC35V, 0.6A	PWM-current-control-type bipolar stepping motor driver and output signal, for pump
	U1S	SM_A+, SM_A-, SM_B+, SM_B-	DC35V, 0.55A	PWM-current-control-type bipolar step motor driver and output signal, for shutter

Block	Location	Signals on diagram	Description	Main Operation
Mechanism-related driver	U2H	IJCOM	Custom IC, DC35V, 0.008A	Power control driver and output signal for ink jet head
Sensor	U4H	PRS	–	Pressure sensor
Battery	BAT1	–	DC3V, 0.05Ah	Lithium battery, for RTC

Air pressure sensor

The air pressure sensor is mounted on the Main circuit board. The printing control is performed according to the ambient pressure of the printer. The pressure specification for this printer is as follows:

Pressure (Altitude): 700 to 1050 hPa (approximately -20 m to 2000 m height above the sea level)

RTC and lithium battery

RTC backed up by a charging-type lithium battery is mounted on the Main circuit board. The printer controls the control operations such as head cleaning according to the RTC time information. The time setting of RTC is not required.

I/F board Unit

The I/F-Board Unit controls communication between the host computer and the TM-J8000. Three different board units are available, as follows:

- UB-S01:RS-232 compatible serial interface
- UB-S02:RS-422 compatible serial interface
- UB-P02:IEEE1284 compatible parallel interface

Power circuit board assembly

The power-board assembly generates the four voltages: +5V, +24BV, +35V, and +37V. These voltages are passed to the main board unit and then used to power the various circuits on the main board unit, as indicated in the Table below.

Table 2-2 Power output voltage Applications

Voltage	Applications
+5 V	•Logic circuitry •Fan-assembly drive circuit
+24 V	•Mechanism assembly (for autocutter) •Drawer kick •Customer display •I/F circuit board unit
+35V	•Mechanism assembly drive
+37 V	•Head-unit drive circuit

Power-ON/OFF control

The TM-J8000 power provides two power switches: one on the front and one on the rear. A block diagram of the power on / off control circuit appears below.

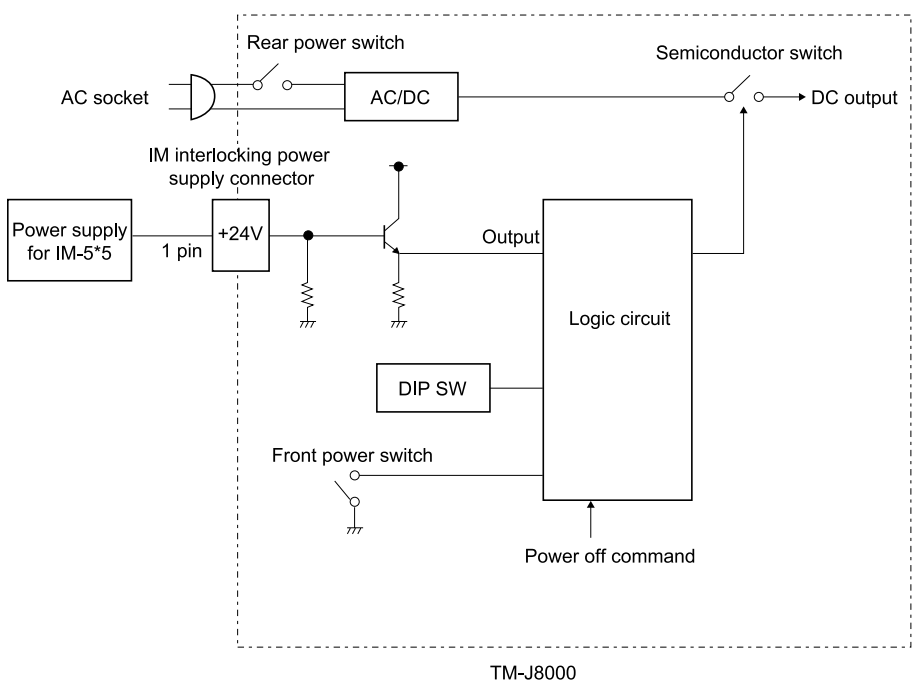


Figure 2-48 Block diagram of power on/off control circuit

The following tables shows how the power on / off logic circuit operates.

Table 2-3 Logic circuit operation (where rear power switch is activated first)

Sequence			Dipswitch Settings		DC Output
(1) Rear Power Switch	(2) Front Power Switch	(3) IM-5*5 Power	DSW2-4	DSW2-5	(Printer Control)
ON	OFF	–	–	–	OFF
	ON	–	–	OFF	ON
	ON	OFF	–	ON	OFF
		ON	–	ON	ON

– : Not relevant

Table 2-4 Logic circuit operation (where rear power switch is activated last)

Sequence			Dipswitch Settings		DC Output
(1) Front Power Switch	(2) IM-5*5 Power	(3) Rear Power Switch	DSW2-4	DSW2-5	(Printer Control)
OFF	–	ON	–	–	OFF
ON	–		OFF	–	OFF
	–		ON	OFF	ON
	OFF		ON	ON	OFF
	ON		ON	ON	ON

– : Not relevant

Switch circuit board assembly

This assembly has the control-panel LEDs and switches. It also has the carriage-cover open detector (magnetic sensor).

Fan assembly

The fan serves to cool the inside of the printer. The fan continues to run so long as +5V VCC is being output.

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Chapter 3

Handling

Before Handling the Product

Before handling the product, carefully read the following sections at the front of this manual: "For Safe Repair and Maintenance Work," "Precautions to Protect the Product," and "Precautions on Handling and Disposal of the Product."

Turning the Power On or Off

The printer has two power switches. The rear power switch, next to the inlet for the power cord, turns on or cuts off the voltage going into the printer. When the rear switch is off, all power is off. When the rear power switch is on and you use the front switch to turn the printer off, power continues to flow within the printer to allow the printer to perform important power down functions, such as capping the nozzles to keep the ink from drying out.

⚠ *CAUTION:*

Since this is an ink jet printer, it must perform power down procedures, such as capping the head, before power is turned off. Therefore, to maintain print quality, you must use correct procedures to power the printer on and off.

⚠ *WARNING:*

If you encounter a problem with the printer, turn off the rear power switch or disconnect the power cord regardless of the correct procedures mentioned here.

There are four appropriate ways to power the printer on and off:

- ❏ Standard mode
- ❏ Power switch fixed mode (power off command mode)
- ❏ IM interlock mode
- ❏ Power switch fixed mode + IM interlock mode

The purpose of each of these power on modes is described in the table below.

Table 3-1 Power on/off modes

Mode	Purpose
Standard mode	Printer power is turned on and off with the front power switch.
Power switch fixed mode (power off command mode)	Printer power is turned on with the power breaker in the shop or with the power strip for the POS system, and it is turned off by software command.
IM interlock mode	The printer is turned on and off with the power switch on the IM-5*5.
Power switch fixed mode + IM interlock mode	The printer can be turned on and off by the procedures for either the power switch fixed mode or the IM interlock mode.

The power on/off mode is set by DIP switches 2-4 and 2-5, as shown in the table below.

Table 3-2 DIP switch settings for power on/off modes

Mode	2-4	2-5
Standard mode	OFF	OFF
Power switch fixed mode (power off command mode)	ON	OFF
IM interlock mode	OFF	ON
Power switch fixed mode + IM interlock mode	ON	ON

Correct procedures for each power on/off mode are described below.

Standard mode

In this mode, the rear power switch remains on, and power is turned on or off with the front power switch.

Table 3-3 Power on/off in standard mode

Power ON	Power OFF
1. The first time power is turned on for the printer: First turn on the rear power switch; then turn on the front power switch.	Turn off only the front power switch.
2. Whenever power is turned on subsequently, use only the front power switch. (The rear switch remains on.)	

Note:
In this mode, the rear power switch is supposed to remain on. However, if you do turn off the rear power switch, note that the printer does not turn on if you turn on the front power switch before the rear power switch. (Turn the rear switch on first; then turn on the front switch.)

Power failure or power plug disconnection

In this mode (DIP switch 2-4 is off), the printer does not automatically turn back on when power returns after a power failure or after the power cable has been disconnected. Turn the front switch off and back on. Then printer power is turned on.

Power switch fixed mode (power off command mode)

This mode allows use of the power off command. Do not use this command in standard mode or IM interlock mode. The front and rear power switches always remain on.

To turn on the printer power, turn on the power breaker in the shop or the power strip for the POS system. To turn off the printer power, you must send the power off command and make sure the POWER LED goes out. Then turn off the power breaker.

⚠ *CAUTION:*

Be sure to use the power off command to turn off the printer. If this command is not sent, drying of ink in the print head may cause printing problems.

Table 3-4 Power on/off using power switch fixed mode

Power ON	Power OFF
1. The first time power is turned on for the printer: First turn on the rear and front power switches; then turn on the power breaker in the shop or the power strip for the POS system.	**1.** Send the power off command.
2. Whenever power is turned on subsequently, use only the power breaker. (The rear and front switches remain on.)	**2.** Be sure the POWER LED goes out. **3.** Turn off the power breaker.

IM interlock mode

In this mode, the rear and front power switches remain on, and power is turned on or off with the IM-5*5 power switch. You must connect the power cord to the AC inlet and the DC power cable from the IM-5*5 power supply unit to the IM interlock connector.

Table 3- Power on/off in IM interlock mode*

Power ON	Power OFF
1. The first time power is turned on for the printer: First turn on the rear and front power switches; then turn on the IM-5*5 power switch.	Turn off only the IM-5*5 power switch.
2. Whenever power is turned on subsequently, use only the IM-5*5 power switch. (The rear and front switches remain on.)	

✎ ***Note:***

In this mode, the rear and front power switches are supposed to remain on. However, if you turn off these switches, note the following things:

- ❏ *The printer does not turn on if the front power switch remains off.*
- ❏ *The printer does not turn on if the front power switch or the IM-5*5 power switch is turned on before the rear power switch is turned on.*

❑ *If either the front or rear power switch is turned off, follow the steps below to turn on printer power.*

*1.Make sure the IM-5*5 power switch is turned off.*
2.Turn on the rear and front power switches.
*3.Turn on the IM-5*5 power switch.*

Power failure or power plug disconnection

In this mode (DIP switch 2-4 is off), the printer does not automatically turn back on when power returns after a power failure or after the power cable has been disconnected. Follow the steps below to turn on the printer power.

1. Turn off the IM-5*5 power switch.
2. Make sure the rear and front power switches are turned on.
3. Turn on the IM-5*5 power switch.

Power switch fixed mode + IM interlock mode

In this mode, the rear and front power switches remain on, and printer power is turned on or off with either of the procedures described in the power switch fixed mode or IM interlock mode.

⚠ *CAUTION:*

If you choose the power switch fixed mode to turn off the printer power, be sure to use the power off command. If this command is not sent, drying of ink in the print head may cause printing problems

Part Names and Functions

The front view of the TM-J8000 is shown below.

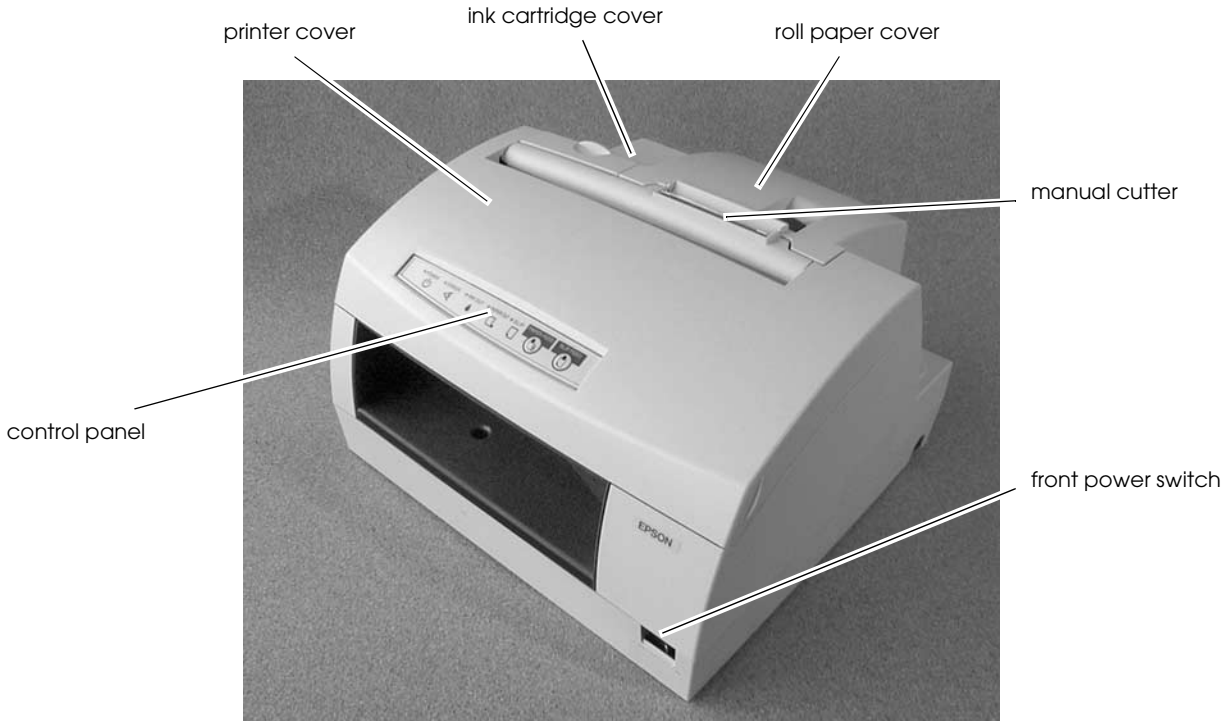

Figure 3-1 Printer front view

Table 3-6 Part names and functions (front view)

Name	Function
Front power switch	Turns the TM-J8000 on and off. The printer on or off operation depends on the mode. In some modes, the printer cannot be turned on with this switch. See "Turning the Power On or Off" in this chapter for details.
Control panel	Printer control panel. See Table 3-9 for details.
Printer cover	Cover is used for the CLEANING button operation and to check error codes. Open the cover to remove paper jams.
Ink cartridge cover	Open this cover to replace the ink cartridge.
Roll paper cover	Open this cover to replace the paper roll and to remove paper jams.
Manual cutter	Use this cutter to manually cut the paper, for example when replacing the paper roll.

The rear view of the TM-J8000 is shown below.

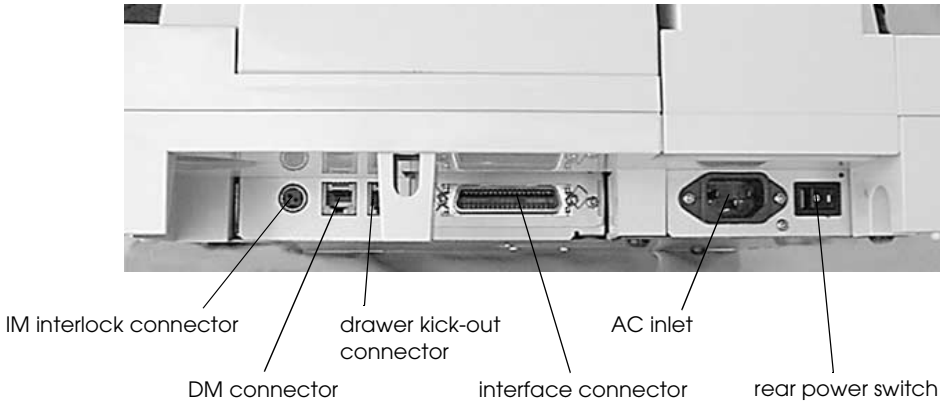

Figure 3-2 Printer rear view

Table 3-7 Part names and functions (rear view)

Name	Function
IM interlock connector	To turn the printer on or off when the EPSON IM-5*5 is turned on or off, connect the TM printer DC cable from the IM-5*5 power supply unit to this connector. (You must connect the power cord too.) The DIP switches must also be set. See "Turning the Power On or Off" in this chapter for details.
DM connector	If a display module is attached, connect it to this connector.
Drawer kick-out connector	If a drawer is attached, connect it to this connector.
Interface connector	Connect the host computer to this connector.
AC inlet	Connect the power cord to this AC inlet.
Rear power switch	This is the power switch of the AC power input for the TM-J8000. The differences from the front power switch are described in the section "Power circuit board assembly" in Chapter 2 "Outline of Operation." Also see "Turning the Power On or Off" in this chapter 3 for details about the switch operation.

A view of the underside of the printer is shown below.

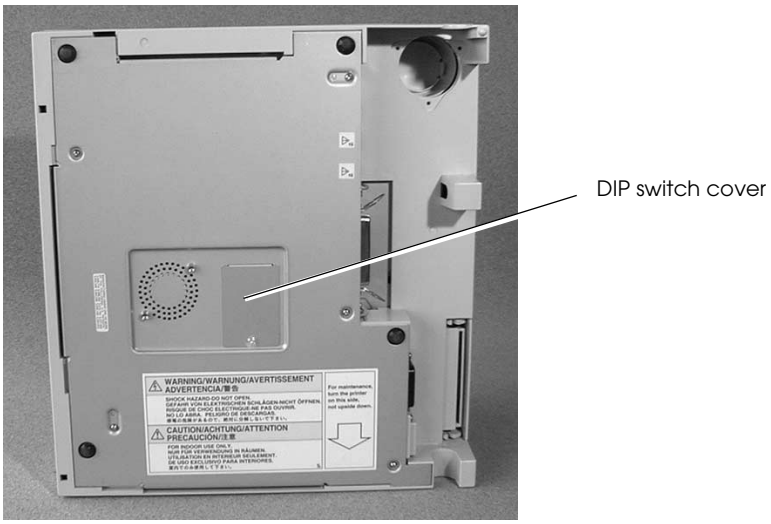

Figure 3-3 Underside of the printer

Table 3-8 Part names and functions (underside)

Name	Function
DIP switch cover	Open this cover to change the DIP switch settings. See "DIP Switches" in Chapter 1, "Specifications," for details.

⚠ CAUTION:

Be sure to turn the printer on its side with the ink cartridge side facing down when you access the DIP switches. Do not turn the printer upside down since it may cause ink to leak. After turning the printer back upright, check whether it prints properly.

A view of the control panel is shown below.

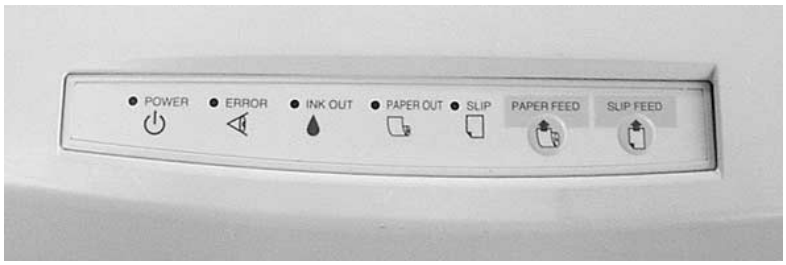

Figure 3-4 Control panel

Table 3-9 Part names and functions

Name	Function
POWER LED (green)	Lit: printer is turned on. Not lit: printer is turned off. Blinking: indicates one of the following: •immediately after power turned on •ink charge operation •printer initialization •head cleaning
ERROR LED (red)	Lit: offline Not lit: online Blinking: error status (See "Error Messages" in Chapter 5, "Repair and Troubleshooting," for details.)
INK OUT LED (red)	Lit: inkend or no ink cartridge mounted Not lit: ink is available Blinking: ink nearend The inkend is automatically determined when the printer detects the ink nearend. Approximately 20,000 characters can be printed (using economy, Font B) after the ink nearend is detected.
PAPER OUT LED (red)	Lit: paperend or paper nearend Not lit: paper is available Blinking: self test continue standby status or macro standby status
SLIP LED (green)	Lit: slip paper selected Not lit: paper roll selected Blinkhing: waiting for slip paper to be inserted
PAPER FEED button	Feeds the paper roll.
SLIP FEED button	Feeds the slip paper.

A view of the printer with the printer cover open is shown below.

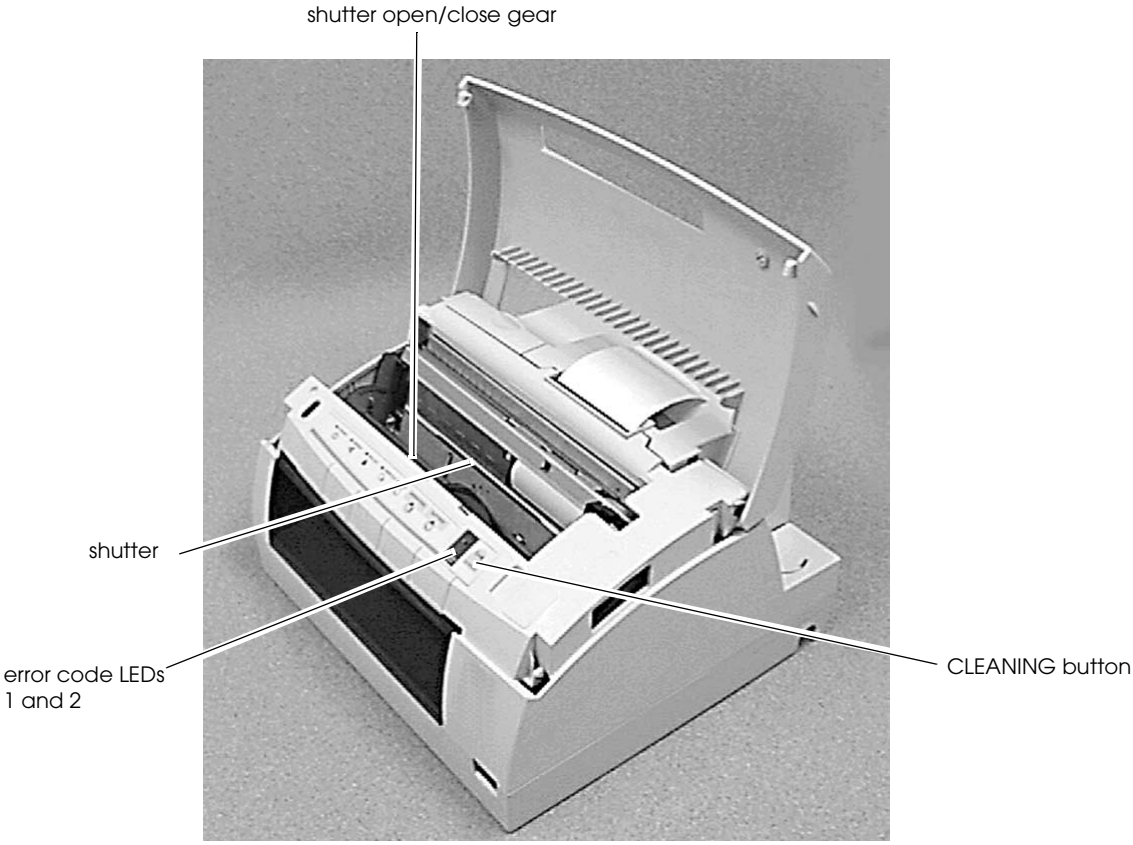

Figure 3-5 Inside printer cover

Table 3-10 Part names and functions (Inside printer cover)

Name	Function
CLEANING button	Starts the head cleaning operation.
ERROR CODE LED 1 (red) ERROR CODE LED 2 (red)	Blinks when an error occurs. The combination of these two LEDs indicates the type of error. See "Error Messages" in Chapter 5, "Repair and Troubleshooting." for details.
Shutter	The shutter is a guide to ensure slip paper is correctly installed. The shutter opens during printing. (The shutter is open in the illustration above.)
Shutter OPEN/CLOSE gear	Turn the gear toward the back to open the shutter. Turn the knob toward the front to close the shutter. Use this knob in the case of paper jams and repairs.

A view inside the roll paper cover is shown below.

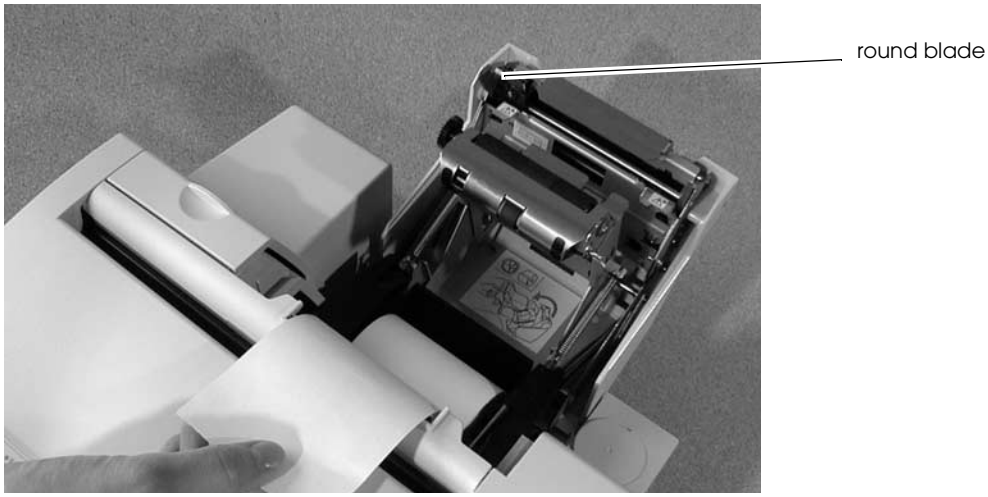

Figure 3-6 Inside roll paper cover

Table 3-11 Part names and functions (inside roll paper cover)

Name	Function
Round blade	Autocutter blade. Combines with the fixed blade in the printer to cut the paper.

Installing or Replacing the Paper Roll

⚠ *CAUTION:*

- *The manual cutter is intended to cut paper. Pressing your fingers on the cutter may result in injury.*
- *The autocutter blades (round cutter and fixed blade) are exposed when the roll paper cover is open. These cutter blades are intended to cut paper. Pressing your fingers on the cutter blades may result in injury.*
- *This product contains other metal parts with sharp edges in addition to the cutters. Pressing your hands or fingers on these parts may result in injury.*

1. Open the paper roll cover by pulling forward on the paper cover release lever and then pushing the cover back.

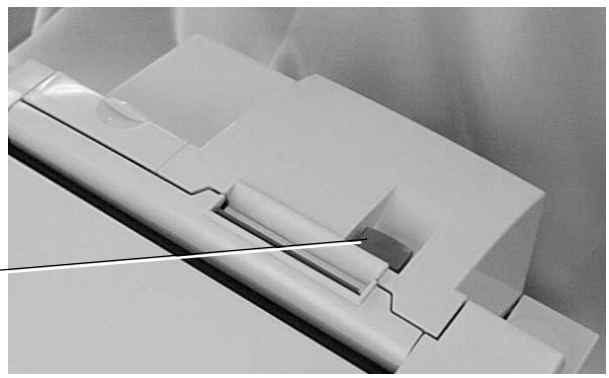

Figure 3-7 Roll paper cover release lever

2. Remove the used paper roll core, if there is one.
3. Insert the paper roll as shown.

Figure 3-8 Loading the paper roll

4. Be sure to note the correct direction for the paper to come off the roll.

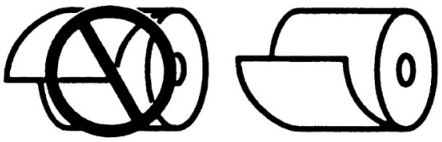

Figure 3-9 Paper roll direction

5. Pull out a small amount of paper, as shown. Then close the cover and tear off the extra paper with the manual cutter by pulling it toward the front of the printer.

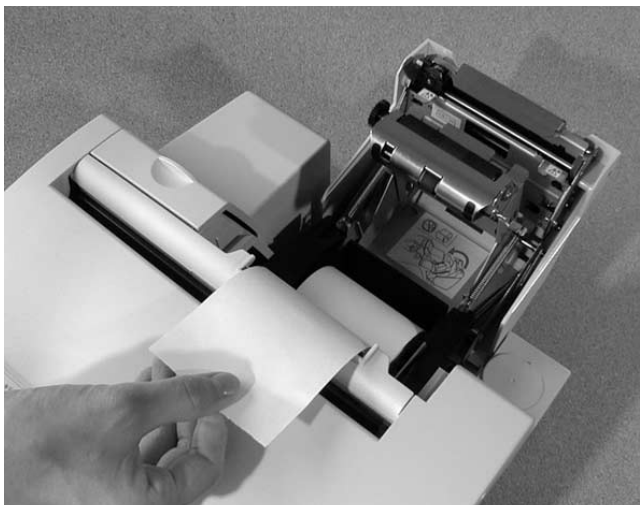

Figure 3-10 Pulling out a small amount of paper

Installing or Replacing the Ink Cartridge

⚠ *CAUTION:*

- *Do not put your finger inside the ink cartridge holder which contains the ink cartridge. The ink supply needle inside the holder may cause injury.*
- *Do not shake or drop an ink cartridge that has been installed. Ink leaking from the cartridge may get in your eyes. Also, ink stains can be impossible to remove from clothing.*
- *If ink from the cartridge gets in your eyes, rinse immediately with clean water and consult a doctor.*
- *Store ink cartridges out of the reach of children.*

To install the ink cartridge, follow these steps.

1. Turn on the power.
2. Open the ink cartridge cover, using the tab as shown.

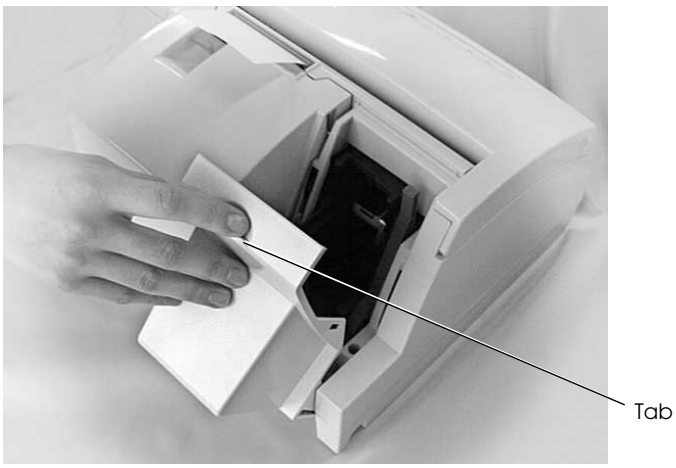

Figure 3-11 Opening the ink cartridge cover

3. Pull back the ink cartridge lever and remove the used ink cartridge if there is one.

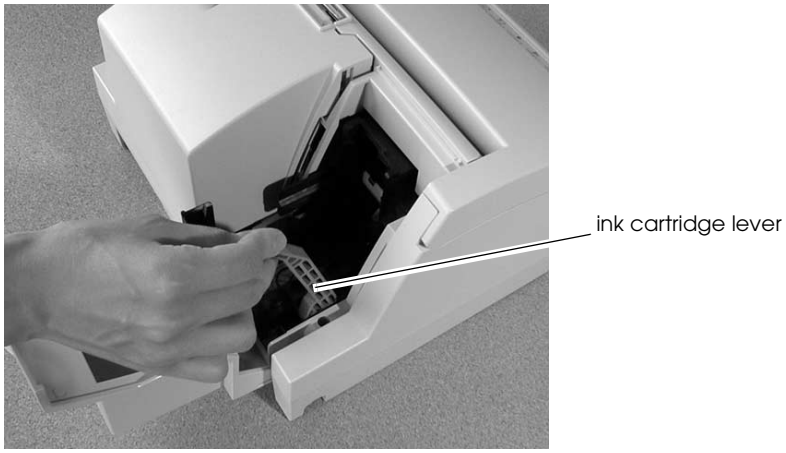

Figure 3-12 Ink cartridge lever

4. Take the new cartridge out of its box and wrapping and insert it label-side up, as shown. Note that there is a diagonal corner on one end of the cartridge so that you cannot insert it incorrectly.

Figure 3-13 Installing the ink cartridge

5. Move the ink cartridge lever back toward the front of the printer, and close the cover.

Note:

- ❏ *The first ink charging is conducted automatically when the first ink cartridge is installed (when the printer is turned on). Do not turn the printer power off during the charging. If the power is turned off, the ink charging will be subsequently repeated, causing a remarkable reduction in ink cartridge printing life. This operation takes approximately two minutes. The* POWER *LED blinks during the ink charging and stays on as soon as the charging is complete.*

- ❏ *Do not remove the ink cartridge unless it is being replaced. A cleaning operation is conducted each time the ink cartridge is removed, causing a reduction in the ink cartridge printing life.*

- ❏ *Press the* CLEANING *button to clean the head only if printing problems are being experienced. The cleaning operation causes a reduction in the ink cartridge printing life.*

- ❏ *Do not turn off the power switch or open the printer cover while the* POWER *LED is blinking; head cleaning or the ink charging is being conducted.*

- ❏ *Replace the ink cartridge while the printer is turned on. If the power is off during replacement, defective printing may occur because the ink cartridge replacement is not correctly detected.*

- ❏ *Use the EPSON SJIC1 ink cartridge. The use of any other cartridge may cause damage to the printer.*

Opening the Printer Cover

When you open the printer cover, pull it toward you a little, as shown below, then lift it up.

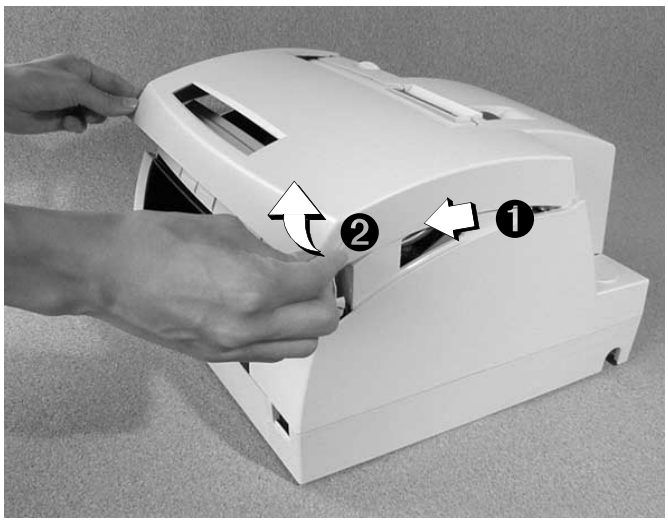

Figure 3-14 Opening the printer cover

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Inserting Slip Paper

When inserting slip paper, be sure that the right side of the paper is against the right side of the paper guide, as shown below.

Figure 3-15 Inserting slip paper

Setting the DIP Switches

If you need to change settings, follow the steps below to make your changes:

⚠ *CAUTION:*

- ❑ *Turn off the printer and unplug the power cord and all cables from the printer before removing the DIP switch cover, to avoid an electric shock.*
- ❑ *Be sure to turn the printer on its side with the ink cartridge side facing down when you access the DIP switches. Do not turn the printer upside down since it may cause ink leakage. After turning the printer back upright, check whether it prints properly.*

1. Make sure the printer is turned off and power cord is unpluged and all cables are disconnected.
2. Remove the screw from the DIP switch cover. Then take off the DIP switch cover, which is shown in the illustration below.

Figure 3-16 DIP switch cover

Attaching or Replacing the Power Switch Covers

⚠ *WARNING:*

If an accident occurs when either power switch cover is attached, unplug the power cord from the outlet immediately to avoid fire or shock.

You can use either or both of the enclosed power switch covers to make sure that a power switch is not accidentally pressed.

Front power switch cover

The illustration below shows the front power switch cover installed.

Figure 3-17 Front power switch cover

If you need to turn the power on or off when the cover is installed, you can insert a thin tool into one of the holes in the cover to operate the switch.

Rear power switch cover

The illustration below shows the rear power switch cover installed. Notice that you must remove a screw from the connector panel and then use it to fasten the switch cover in place.

Figure 3-18 Rear power switch cover

Removing Paper Jams

Paper jams near the head

1. Open the printer cover.
2. Use the shutter OPEN/CLOSE gear to open the shutter, if necessary.

3. Remove the jammed paper.

Figure 3-19 Shutter OPEN/CLOSE gear

Paper jams near the autocutter

1. Open the roll paper cover.

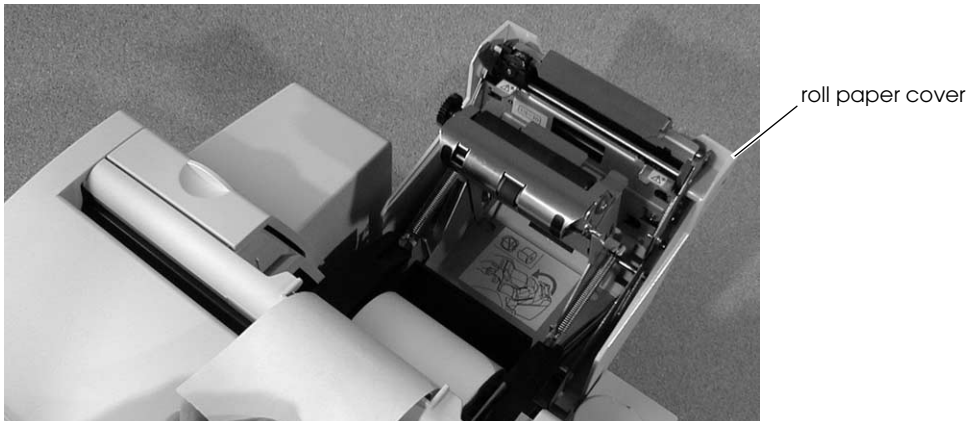

Figure 3-20 Opening the roll paper cover

2. Remove the jammed paper.

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Self Test

The self test is used to check whether the printer is operating correctly.

Running the self test on a paper roll

1. Install the paper roll, and make sure the printer is turned off and the printer cover is closed properly.
2. While holding down the PAPER FEED button, turn on the printer power. The self test prints the printer settings and then prints the following, cuts the paper, and pauses. (The PAPER OUT LED blinks.)

```
Self test printing.

Please press the PAPER FEED button.
```

3. Press the PAPER FEED button to continue printing. The printer prints a pattern using the built-in character set.
4. The self test automatically ends and cuts the paper after printing the following:

```
***completed***
```

The printer is ready to receive data as soon as it completes the self test.

Note:
To pause the self test manually, press the PAPER FEED *button. Press the* PAPER FEED *button again to continue the self test.*

Running the self test on slip paper

Note:
- ❑ *Be sure to install a paper roll to prevent slip paper jams.*
- ❑ *Use an A4 or U.S. letter size sheet for the test print.*

1. Make sure the printer is turned off and the printer cover is closed properly.
2. While holding down the SLIP FEED button, turn on the printer to begin the self test. (The SLIP LED blinks.)
3. Feed a sheet of slip paper (A4 or U.S. letter size) into the printer. The printer loads the paper automatically, prints the printer settings, and then ejects the paper. (The SLIP LED blinks.)
4. Remove the paper from the printer and feed another sheet of slip paper into the printer to print characters from the character table. Continue to feed slip paper (A4 or U.S. letter size) into the printer until the self test prints the following:

```
***completed***
```

The printer is ready to receive data as soon as it completes the self test.

Note:
If you want to pause the self test manually, press the SLIP FEED *button. Press the* SLIP FEED *button again to continue the self test.*

Hexadecimal Dump

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. When you turn on the hex dump function, the printer prints all commands and other data in hexadecimal format, along with a guide section to help you find specific commands.

Starting the hexadecimal dump

Printing on the paper roll

1. Install a paper roll.
2. After you make sure the printer is off, open the cover.
3. Hold down the PAPER FEED button while you turn on the printer.
4. Close the printer cover.
5. Run any software program that sends data to the printer. The printer prints "Hexadecimal Dump" and then all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes.
6. Open the cover to set the printer offline so that it will print the last line.
7. Close the cover and turn off the printer or reset it to turn off the hex dump mode.

Printing on slip paper

Note:
- ❏ *Be sure to install a paper roll to prevent slip paper jams.*
- ❏ *Use an A4 or U.S. letter size sheet for the test print.*

1. After you make sure the printer is off, open the cover.
2. Hold down the SLIP FEED button while you turn on the printer.
3. Close the printer cover.
4. Insert a sheet of slip paper (A4 or U.S. letter size) when the SLIP LED blinks.

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5. Run any software program that sends data to the printer. The printer prints "Hexadecimal Dump" and then all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes.

6. Open the cover to set the printer offline so that it will print the last line.

7. Close the cover and turn off the printer or reset it to turn off the hex dump mode.

Print sample

A sample of a hexadecimal dump is shown below.

```
Hexadecimal Dump
1B 21 00 1B 26 02 40 40 : . ! . . & . @ @
1B 25 01 1B 63 34 00 1B : . % . . C 4 . .
41 42 43 44 45 46 47 48 : A B C D E F G H
```

Figure 3-21 Print sample of hexadecimal dump

- A period (.) is printed for each code that has no ASCII equivalent.
- During the hex dump all commands except DLE EOT and DLE ENQ are disabled.

Chapter 4

Maintenance and Inspection

Proper maintenance is essential for keeping the printer in peak working condition, extending its useful life, and preventing operational failures. Maintenance and inspection should be carried out as described below.

Before Maintenance and Inspection

Before maintenance or inspection, carefully read the following sections at the front of this manual: “For Safe Repair and Maintenance Work,” “Precautions to Protect the Product,” and “Precautions on Handling and Disposal of the Product.”

Cleaning

Head cleaning

Follow the procedure below to clean the head.

1. Turn on the printer.
2. Open the printer cover.
3. Press the CLEANING button and close the printer cover. The POWER LED blinks while head cleaning is conducted.
4. The POWER LED stays on when cleaning is complete.
5. Test the printing. If print quality has not improved, execute the head cleaning again.

Note:
If you have performed the head cleaning more than five times and the print quality is still poor, you may need to repair the product such as replacing the head unit or main circuit board unit.

Removing stains

Wipe off stains using a soft dry cloth (a lint-free cloth). If stains cannot be wiped off, use a neutral cleanser.

⚠CAUTION:

- *Do not touch or contact any objects to the cap and cleaning plate on the Pump unit to maintain print quality.*

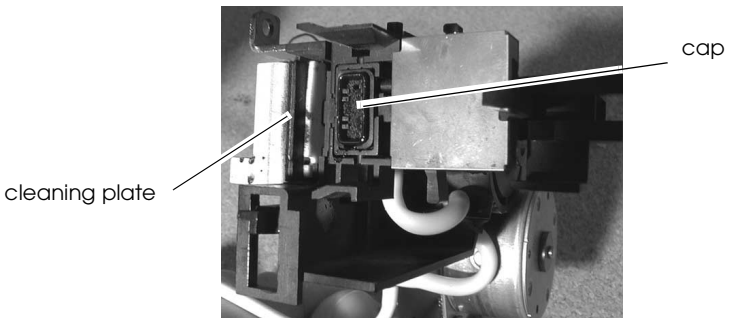

Figure 4-1 Cap and cleaning plate on the Pump unit

- *Do not touch or contact any objects to the head nozzle to maintain print quality.*

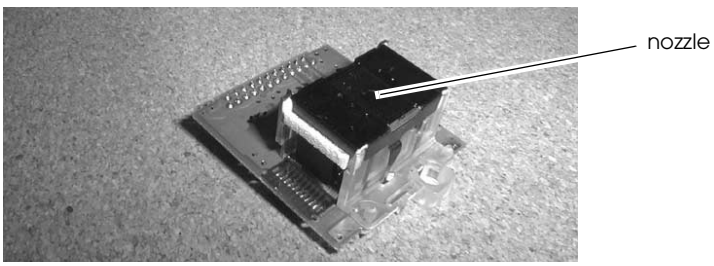

Figure 4-2 Head nozzle

- *Do not clean with alcohol, benzene, trichloroethylene, or ketone-based cleaners, as these may cause damage to plastic and rubber components.*
- *Do not touch the ink. If ink accidentally gets on your hands, wash it off immediately with soap and water. If ink gets in your eyes, wash your eyes immediately with a large quantity of water and consult a doctor.*

Removing dirt and dust

Use a vacuum-type cleaner or a lint-free cloth to remove dirt and dust from all locations.

Be sure to carefully remove as much paper dust as you can from the cap, cleaning plate and head nozzle. Dust attached to this area can cause poor-quality printing (dots missing). However, remember that you should never directly touch the cap, cleaning plate and head nozzle when cleaning these areas.

Lubrication

Lubrication is a particularly important element in keeping the printer operating properly for as long as possible. Therefore, lubricate at prescribed intervals, using the correct lubricants.

Lubrication standards

To lubricate during disassembly or assembly, clean the parts thoroughly before lubricating them. Always lubricate in the following situations even if the time for lubrication has not been reached: disassembly, replacing the parts, and wiping off of the lubrication during cleaning.

Lubricant types

The lubricant types have a great effect to the printer's performance and durability. Epson regularly conducts intensive testing and analysis of the technical information concerning various lubricants and prescribes the lubricants to be used with the printer on the basis of the results. Therefore, use the correct lubricants prescribed in the manual. The lubricants are available in 40 cc (40 gr) plastic containers (the smallest unit of supply).

Lubricants for this printer

Type	Name	Amount	Availability
Oil	O-10	40 gr (1.4 oz)	Supplied by Epson
Grease	G-19	40 gr (1.4 oz)	Supplied by Epson
	G-31	40 gr (1.4 oz)	Supplied by Epson
	G-36	40 gr (1.4 oz)	Supplied by Epson
	G-47	40 gr (1.4 oz)	Supplied by Epson
	G-48	40 gr (1.4 oz)	Supplied by Epson

Lubrication points

See Chapter 6, which describes disassembly / asssembly procedures.

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Chapter 5

Repair and Troubleshooting

Repairing the Printer

Before Repairing

Before repairing, carefully read the following sections at the front of this manual; "For Safe Repair and Maintenance Work," "Precautions to Protect the Product," and "Precautions on Handling and Disposal of the Product."

Service Tools Required For This Printer

The following tools are supplied by Epson.

Table 5-1 Service tools supplied by Epson

Epson Service Tool	Purpose	Where To Obtain
Ink discharging cartridge	Receives ink from the ink system of the printer.	Supplied as a service part. See the Service Parts Price List for details.
Home position asjustment tool	Used to adjust the position of the HP detector.	Supplied as a service tool. See the Service Parts Price List for details.
TM-J8000 Service Utility	Contains the following functions: 1. Ink discharging sequence 2. Head exchange sequence 3. L-R Adjustment of the head, etc.	Contact the Epson service center

The following tools are available commercially. Obtain the tools required.

Table 5-2 Tools available commercially

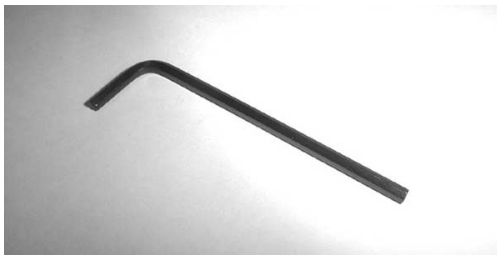
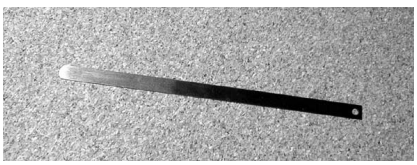
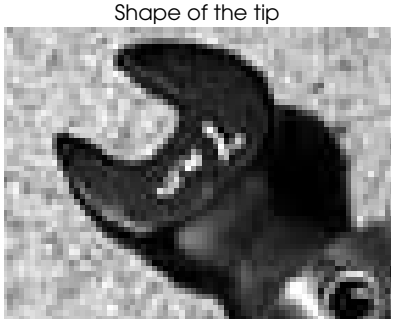
Commercial Tool	Size	Purpose
Hexagon wrench  Shape of the tip 	2.5 mm	To remove the hexagon socket head bolts. The bolts are used to secure the Plate,lower assembly. (You need this tool to mount or dismount the Main circuit board unit and the Power circuit board assembly, etc.)
Gap gauges 	<Thickness> 0.65 mm x 1 0.70 mm x 1 <Length/width> Length: 10 cm min. Width: 7 to 14 mm (*) Do not use a gap gauge wider than indicated above as this may damage to the nozzle of the Head unit.	To adjust the platen gap.
	0.80 mm x 2	To adjust the Slip hold top roller gap

Table 5-2 Tools available commercially

Commercial Tool	Size	Purpose
Torque-limiting wrench Shape of the tip 	<Shape of the tip> 7 mm <Tightening torque> 0.12 to 0.16 N-m (1.2 to 1.6 kg-cm) (*) Tightening torque should be set by the tool supplier.	To tighten the Joints,M6. (The Joints,M6 is mounted on the Damper sub-unit). Tightening with any other tool may damage the tube and cause ink leaks. Low tightening torque may also cause ink leakage.
Finger stall (At least 2 stalls)	–	To handle the tube of the Damper sub-unit.
Crosshead screwdriver	No. 0	Other assembly/ disassembly
Crosshead screwdriver	No. 1	Other assembly/ disassembly
Crosshead screwdriver	No. 2	Other assembly/ disassembly
Flathead screwdriver	–	Other assembly/ disassembly
Tweezers	–	Other assembly/ disassembly
E-ring holder	1.5, 2.0, 2.5, 3.0, 4.0 and 6.0	Other assembly/ disassembly
Soldering iron	–	Other assembly/ disassembly
Wrist band	–	Other assembly/ disassembly

Sequences Required for Repair

The table below describes the sequences required for repairing the printer.

Table 5-3 Repair and sequence

Stage of Repair	Work	Sequence	How to Run the Sequence
Confirming the problem	Running a print test	Self test	See page 3-20
	Running a nozzle test	Nozzle test	See page 5-8
	Cleaning the head	Head cleaning	See page 4-1
Disassembly and assembly	Performing any of the following • Removing the head unit • Removing the pump unit • Removing the carriage unit	Head exchange sequence	See page 5-6
	Performing any of the following • Removing the cartridge frame unit • Disassembling the ink system except for the head unit, pump unit, and carriage unit	Ink discharging sequence	See page 5-5
	Checking the printout after you have disassembled and repaired the ink system	Ink charging sequence	Turn on the printer and install the ink cartridge. The sequence starts automatically. This sequence takes approximately two minutes. The POWER LED blinks during the ink charging and stays on as soon as the charging is complete.
Adjustment	Performing the "LR adjustment"(*)	LR adjustment sequence	See page 6-214
Transportation	Returning the printer after you have finished the repair	Ink discharging sequence	See page 5-5

(*)To find out when you need to perform the "LR adjustment," see Table 6-2 on page 6-196,

Note: The difference between the head exchange sequence and the ink discharging sequence:

- *The head exchange sequence discharges ink from the head unit and the parts near the head. After the discharging, it moves the head carriage to the left end. This means the head is uncapped and the head carriage is unlocked. This sequence is not only for the head unit but also is used when you disassemble the pump unit and the carriage unit.*

- *The ink discharging sequence discharges all ink from the ink system of the printer. After discharging, it performs head capping and locking the head carriage.*

Ink Discharging Sequence

Perform this sequence before you disassemble the ink system for the TM-J8000 printer. You need a PC computer with an interface cable, the TM-J8000 Service Utility, and an ink discharging cartridge to execute this sequence.

Follow the steps below to perform the sequence.

1. Install a paper roll in the printer. (The sequence does not work without a paper roll.)
2. Connect a PC computer with an appropriate interface cable and set the data communication parameters; then turn on the computer and printer power.
3. Run the TM-J8000 Service Utility, and follow the screen messages to set the interface type.
4. Choose the "Ink discharge sequence" option on the main menu.
5. Cross out a number from the table on the label of the ink discharging cartridge. If the cartridge is used more than 26 times, do not use it.
6. When the PAPER OUT LED blinks, replace the ink cartridge with the ink discharging cartridge.
7. Press the PAPER FEED button. The printer begins the ink discharging sequence and blinks the POWER LED.
8. When the POWER LED blinking stops, the ink discharging sequence is finished. Turn off the front power switch.
9. Make sure the POWER LED goes off; then turn off the rear power switch.
10. Remove the ink discharging cartridge and paper roll.

Head Exchange Sequence

This sequence is used before you replace the head unit of the TM-J8000 printer. You need a PC computer with an interface cable, the TM-J8000 Service Utility, and an ink discharging cartridge to execute this sequence.

Follow the steps below to perform the sequence.

1. Install the paper roll in the printer. (The sequence does not work without the paper roll.)
2. Connect a PC computer with an appropriate interface cable and set the data communication parameters; then turn on the computer and printer power.
3. Run the TM-J8000 Service Utility and follow the screen message to set the interface type.
4. Choose the "Head exchange sequence" option on the main menu.
5. Cross out a number from the table on the label of the ink discharging cartridge. If the cartridge is used more than 26 times, do not use it.
6. When the PAPER OUT LED blinks, replace the ink cartridge with the ink discharging cartridge.
7. Press the PAPER FEED button. The printer begins the head exchange sequence and blinks the POWER LED.
8. When the head exchange sequence is finished, the POWER LED blinking stops and the PAPER OUT LED blinks.
9. Turn off the front power switch. The printer moves the head carriage to the left end position before the power goes off.
10. Make sure the POWER LED goes off; then turn off the rear power switch.
11. Remove the ink discharging cartridge and paper roll.

Note:
You can also perform the head exchange sequence with the following procedure.

1. *Install the paper roll in the printer. (The sequence does not work without the paper roll.)*
2. *Turn the printer power on, then turn off the front power switch.*
3. *Open the printer cover.*
4. *While holding down the CLEANING button, turn on the printer using the front switch.*
5. *Release the CLEANING button.*
6. *Press the CLEANING button 14 times, then close the printer cover.*

7. *Cross out a number from the table on the label of the ink discharging cartridge. If the cartridge is used more than 26 times, do not use it.*

8. *When the* PAPER OUT *LED blinks, replace the ink cartridge with the ink discharging cartridge.*

9. *Press the* PAPER FEED *button. The printer begins the head exchange sequence and blinks the* POWER *LED.*

10. *When the head exchange sequence is finished, the* POWER *LED blinking stops and the* PAPER OUT *LED blinks.*

11. *Turn off the front power switch. The printer moves the head carriage to the left end position before the power goes off.*

12. *Make sure the* POWER *LED goes off; then turn off the rear power switch.*

13. *Remove the ink discharging cartridge and paper roll.*

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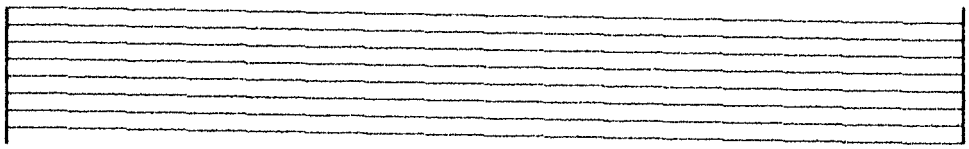
Nozzle Test

If the printout has missing dots, you can confirm whether a nozzle is clogged using the nozzle test. You need a PC and interface cable, and the TM-J8000 Service Utility, to run this test.

Follow the steps below.

1. Install a paper roll in the printer.
2. Connect a PC to the printer with the appropriate interface cable and set the data communication parameters; then turn on the computer and printer power.
3. Run the TM-J8000 Service Utility, and follow the screen messages to set the interface type.
4. Choose the "Nozzle Test" option on the main menu.
5. The program prints the following pattern.



(200% scale)

Figure 5-1 Nozzle test pattern

6. Check the pattern and if you see missing dots, clean the ink jet head. See the "Cleaning " section in Chapter 4 for instructions on cleaning the head.
7. If you have performed the head cleaning more than five times and the printout still has missing dots, you may need to repair the product either by replacing the head unit or main circuit board unit.

Preparing for transport

Follow the steps below before you transport the TM-J8000 printer.

1. Perform the ink discharging sequence. See the "Ink discharging sequence" section in this chapter.
2. Remove the power cord and all the cables from the printer.
3. Pack the printer in the specially made packing box, along with the accessories for the TM-J8000.

Note:
The following are instructions for the end user. Be sure to tell customers these things before they send the printer back to you for repair.

1. *Turn off the printer power using the front power switch. Be sure the POWER LED goes out; then turn off the rear power switch. This operation caps the ink jet head to keep it from drying out.*
2. *Remove the ink cartridge and paper roll.*
3. *Remove the power cord and all the cables from the printer.*
4. *Pack the printer in the specially made packing box for the TM-J8000.*

Troubleshooting

⚠ WARNING:

Do not replace the fuse in the Power circuit board assembly. Replacing this fuse may result in electric shock or fire. This fuse prevents electric shock and fire in the event of abnormal power supply input; it does not protect the components in the Power circuit board assembly.

Replace the entire Power circuit board assembly if the fuse blows. Other components in the Power circuit board assembly are damaged if the fuse has blown.

Symptoms

The table below shows problem symptoms and suggests remedies.

Table 5-4 Troubleshooting table (by symptom)

Symptom	Check Item	Remedy
POWER LED does not light	1. Check that power was turned on correctly.	1. See "Turning the Power On and Off" in Chapter 3.
	2. Check DC output of the Power circuit board assembly. (See Table 5-11.)	1. Replace the Power circuit board assembly. Do not replace the fuse in the Power circuit board assembly. See the WARNING on this page.
	3. Check the logic circuit power supply in the main circuit board unit. (See Table 5-12.)	1. Replace the Main circuit board unit. 2. Replace the Mechanism assembly.
POWER LED lights but Mechanism assembly does not make initial movements.	1. Check DC output of the Power circuit board assembly. (See Table 5-11.)	1. Replace the Power circuit board assembly.
	2. Check if fuse F1 is blown on the Main circuit board unit.	1. Replace the Main circuit board unit. 2. Replace the Mechanism assembly.
	3. Check the Mechanism assembly power supply in the Main circuit board unit. (See Table 5-12.)	1. Replace the Main circuit board unit.
	4. None of the above.	1. Replace the Main circuit board unit.
Defective printing	1. Run the nozzle test in the TM-J8000 Service Utility. See the Nozzle Test section in Chapter 5, "Repair and Troubleshooting."	1. Clean the head according to the instructions in the "Nozzle Test" section.
	2. Check the head rank setting. See Chapter 6, "Disassembly, Assembly, and Adjustment."	1. Correct the setting.
	3. Check the LR Adjustment. See Chapter 6, "Disassembly, Assembly, and Adjustment."	1. Adjust the Head LR.
	4. None of the above.	1. Replace the Head unit. 2. Replace the Main circuit board unit. 3. Replace the Pump unit.

Table 5-4 Troubleshooting table (by symptom)

Symptom	Check Item	Remedy
Ink marks on paper	1. Check for ink-soaked paper waste in the range of movement of the Head carriage sub-assembly and on the paper path.	1. Clean away the paper waste.
	2. Check the platen gap. See Chapter 6, "Disassembly, Assembly, and Adjustment."	1. Adjust the platen gap.
Cannot insert ink cartridge	1. Check for deformation of the Holder,absorber.	1. Replace the Holder, absorber.

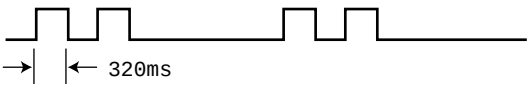
Error Messages

When a printer error occurs, the printer indicates the type of error with the codes created by flashing the ERROR LED and ERROR CODE LEDs 1 and 2. This flashing pattern can be used to determine where the error occurred.

Identifying the error type

The ERROR LED indicates whether the error can be reset by commands sent from the host computer. The reset conditions are not discussed in detail in this manual.

Table 5-5 ERROR LED flashing pattern

Reset condition	Flashing pattern
Can be reset	
Automatic reset	
Cannot be reset	

The ERROR CODE LEDs 1 and 2 indicate the type of error with the Flashing pattern combination of these lights. See the Table 5-8, "Error codes" for details.

Table 5-6 ERROR CODE 1 LED flashing pattern

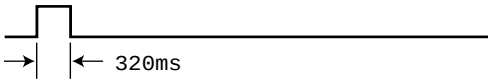
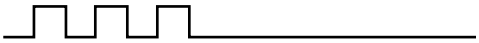
Flashing pattern name	Error type	Flashing pattern
Pattern A	Mechanical error	
Pattern B	Head-related error	
Pattern C	Power supply error	
Pattern D	Circuit board (driver, etc.) error	
Pattern E	Circuit board (CPU/ memory) error	

Table 5-7 ERROR CODE 2 LED flashing pattern

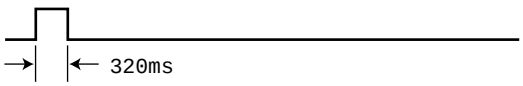
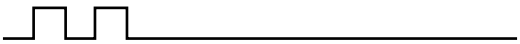
Flashing pattern name	Flashing pattern
Pattern 1	
Pattern 2	
Pattern 3	
Pattern 4	
Pattern 5	

Table 5-7 ERROR CODE 2 LED flashing pattern

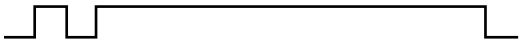
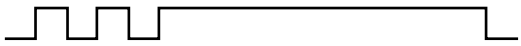
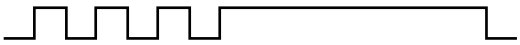
Flashing pattern name	Flashing pattern
Pattern 6	
Pattern 7	
Pattern 8	

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Table 5-8 Error codes

		ERROR CODE 1				
		A	**B**	**C**	**D**	**E**
		Mechanical error	**Head-related error**	**Power supply error**	**Circuit board (driver, etc.) error**	**Circuit board (CPU/memory) error**
ERROR CODE 2	**1**	Carriage out-of-step error	Head overheat error	Mechanical system power supply overvoltage error	Circuit board overheat error	ROM 1 error
	2	Carriage HP detect error	Head underheat error	Mechanical system power supply undervoltage error	Circuit board thermistor error	ROM 2 error
	3	Autocutter error	Head applied voltage overvoltage error	Head power supply overvoltage error	Mechanical system applied voltage overvoltage error	RAM 1 error
	4	Slip ejection error	Air pressure error	Head power supply undervoltage error	Overcurrent error	RAM 2 error
	5	Roll paper cover open error	–	–	–	G/A 1 error
	6	Shutter error	–	–	–	G/A 2 error
	7	Pump error	–	–	–	EEPROM error
	8	–	–	–	–	CPU run error

Error descriptions and remedies

The table below describes the errors and suggests remedies.

Table 5-9 Error descriptions and remedies

Error type	Description	Remedy (in order of probability)
Carriage out-of-step error	No output from carriage detector when the Motor,carriage's movement is instructed.	1. Remove paper jam/paper residue from the Carriage unit. 2. Check the Carriage unit cable is connected. 3. Check for discontinuity in FFC connected to the Carriage unit. 4. Check the Detection plate,carriage. 5. Replace the Carriage unit. 6. Replace the Main circuit board unit.
Carriage HP detect error	Carriage head home position was not detected normally.	As above
Autocutter error	An autocutter error was detected.	1. Remove paper jam/paper residue from the Cutter sub-unit. 2. Check the Cutter sub-unit cable is connected. 3. Check electrical resistance of the Motor,AC. (See Table 5-10.) 4. Replace the Roll paper unit (or the Cutter sub-unit). 5. Replace the Main circuit board unit.
Slip eject error	Slip paper was not ejected normally.	1. Remove paper jam/paper residue from the slip paper path. 2. Re-install the Solenoid,J/S changeover. 3. Replace the Shutter unit. 4. Replace the Mechanism assembly.
Roll paper cover open error	The roll paper cover was opened during printing.	1. Close the roll paper cover.
Shutter error	The home position of the Shutter unit was not detected normally.	1. Remove paper jam/paper residue from the Shutter unit. 2. Replace the Shutter unit.
Pump error	The home position of the Pump unit was not detected normally. Or, an abnormality was detected in the Pump unit control circuits.	1. Replace the Pump unit. 2. Replace the Main circuit board unit.
Head overheat error	The head temperature is too high.	1. Check if the Fan assembly is working correctly. 2. Ensure that the ambient temperature is within the specified range.
Head underheat error	The head temperature is too low.	1. Check if the Head FPC ("Fp circuit, head") is connected properly. 2. Check for discontinuity in Head FPC ("Fp circuit, head"). 3. Ensure that the ambient temperature is within the specified range.
Head applied voltage overvoltage error	The voltage applied to the head is too high.	1. Replace the Main circuit board unit.
Air pressure error	An abnormal air pressure was detected.	1. Ensure that the ambient air pressure is within the specified range.

Table 5-9 Error descriptions and remedies

Error type	Description	Remedy (in order of probability)
Mechanical system power supply overvoltage error	The mechanical system voltage (+35 V system) is too high.	1. Replace the Power circuit board assembly. 2. Replace the Main circuit board unit.
Mechanical system power supply undervoltage error	The mechanical system voltage (+35 V system) is too low.	As above
Head power supply overvoltage error	The head voltage (+38 V system) is too high.	As above
Head power supply undervoltage error	The head voltage (+38 V system) is too low.	As above
Circuit board overheat error	The Main circuit board unit temperature is too high.	1. Check if the Fan assembly is working correctly. 2. Replace the Main circuit board unit.
Circuit board thermistor error	An abnormal Main circuit board unit temperature was detected.	1. Replace the Main circuit board unit.
Mechanical system applied voltage overvoltage error	An abnormality was detected in the Main circuit board unit Q10, ZD1 peripheral circuits.	1. Replace the Main circuit board unit.
Overcurrent error	The current to the autocutter is too high. Or, an error was detected in gate array U2 and/or U3.	1. Replace the Mechanism assembly. 2. Replace the Main circuit board unit.
ROM 1 error	An abnormality was detected in the program ROM (U4).	1. Replace the Main circuit board unit.
ROM 2 error	An abnormality was detected in the CGROM (U5).	As above
RAM 1 error	An abnormality was detected in the CPU internal RAM.	As above
RAM 2 error	An abnormality was detected in the DRAM (U8).	As above
G/A 1 error	An error was detected in the gate array (U2).	As above
G/A 2 error	An error was detected in the gate array (U3).	As above
EEPROM error	An error was detected in the EEPROM (U15).	As above
CPU run error	CPU abnormal operation was detected.	As above

Troubleshooting Tables

Table 5-10 Motor/solenoid resistance values

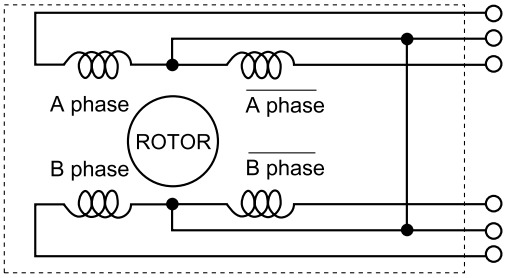
Motor/solenoid name	Diagram	Resistance value
Motor,AC	–	Approx. 17 Ω
Motor,carridge		Approx. 9 Ω (per phase)
Motor,shutter		Approx. 9 Ω (per phase)
Motor,pump	As above	Approx. 9 Ω (per phase)
Motor,paper feed	As above	Approx. 22 Ω (per phase)
Solenoid,J/S changeover	–	Approx. 40 Ω
Solenoid,slip hold,top	–	Approx. 30 Ω

Table 5-11 Test points for the power circuit board assembly (*)

Class	Description	Connector terminal	Normal value (DC)
Power supply	Ink jet head drive power supply	CN 3 pin # 1	+38 V
	Mechanism assembly drive power supply	CN 3 pins, # 4, 5	+35 V
	Logic circuit power supply	CN 3 pin # 7	+5 V
	Power supply for the following devices: •mechanism assembly (autocutter drive) •drawer •customer display •I/F circuit board unit	CN 3 pin # 9	+24 V
	GND	CN 3 pins, 2, 3, 6, 8	0 V

(*) The Power circuit board assembly also operates in the non-load status.

Table 5-12 Test Points for the main circuit board unit

Class	Description	Test terminal	Component terminal	Normal value (DC)
Logic circuit power supply (VCC)	Semiconductor switch ON	SW5V	–	0 ~ 0.4 V
	Semiconductor switch OFF			4.8 ~ 5.2 V
	Logic circuit power supply (VCC) (Q1 ON)	–	Q1, terminal D	5 V
	Logic circuit power supply (GND)	SG	–	0 V
Mechanism assembly power supply	+35 V-component drive power supply (Q2 ON)	–	Q2, terminal D	35 V
	+24 V-component (Motor,AC) drive power supply (U10 ON)	–	U10 pin # 3	24 V
	Ink jet head power supply	IJCOM	–	~ 35 V
	Ink jet head power supply	VP	–	37 ~ 42.5 V
Motor,carriage	During Motor,carriage drive	REF_CR	–	0.4 ~ 3.0 V
	Motor,carriage stationary			4.2 ~ 5.2 V
Motor,pump	During Motor,pump drive	REF_PM	–	6.08 ~ 6.40 V
	Motor,pump stationary (hold)			3.90 ~ 4.16 V
Motor,paper feed	During Motor,paper feed drive	REF_PF	–	5.01 ~ 6.40 V
	Motor,paper feed stationary (hold)			2.56 ~ 2.74 V
Motor,shutter	During Motor,shutter drive	REF_SM	–	4.98 ~ 5.27 V
	Motor,shutter stationary (hold)			1.45 ~ 1.57 V
Solenoid,slip hold,top	For Solenoid,slip hold,top	REF_PL	–	3.25 ~ 4.78 V
RTC	RTC power supply	VBAT	–	2 ~ 3.55 V
I/F circuit board unit power supply	–	IF24V	–	24 V
Customer display power supply	–	DM24V		23 ~ 25 V
Drawer power supply	U1K is ON	–	U1K pin # 3	24 V
Front power switch	Front power switch control power supply	PC5V	–	4.8 ~ 5.2 V

(*) Some of the test points are indicated as test terminals on the circuit board. For the other test points, check the component terminals.

Chapter 6

Disassembly, Assembly, and Adjustment

Before disassembly, assembly, and adjustment

Before disassembly, assembly, and adjustment, carefully read the following sections at the front of this manual; "For Safe Repair and Maintenance Work," "Precautions to Protect the Product," and "Precautions on Handling and Disposal of the Product."

About this chapter

This chapter consists from the following sections.

- ❑ Disassembly and assembly for the TM-J8000 / J8000P
  Describes how to disassemble and assemble the TM-J8000 / J8000P to the unit level.
- ❑ Disassembly and assembly for the mechanism assembly, M-J8000
  Describes how to disassemble and assemble the mechanism assembly to the unit level.
- ❑ Assembling the roll paper unit
  Describes how to assemble the roll paper unit.
- ❑ Assembling the shutter unit
  Describes how to assemble the shutter unit.
- ❑ Assembling the carriage unit
  Describes how to assemble the carriage unit.
- ❑ Assembling the cartridge frame unit
  Describes how to assemble the cartridge frame unit.
- ❑ Assembling the pump unit
  Describes how to assemble the pump unit.
- ❑ Settings and adjustments
  Describes how to adjust or set the TM-J8000 / J8000P printer.

Screws

This section lists the type of screws used in this manual.

Table 6-1 Screws

Head (side)	Head (top)	Terms	Body	Washer (assembled)
C(Cross)	B(Bind)	C.B.	Machine screw	–
		C.B.B-tite	Self tapping screw (B-type)	–
		C.B.P-tite	Self tapping screw (P-type)	–
		C.B.S-tite	Self tapping screw (S-type)	–
	C(Cup)	C.C.	Machine screw	–
		C.C.S-tite	Self tapping screw (S-type)	–
	P(Pan)	C.P.(B)	Machine screw	Spring lock washer
		C.P.(O)	Machine screw	Outside toothed lock washer
		C.P.(S-P1)	Machine screw	Spring lock washer and plain washer (type 1)
		C.P.B-tite	Self tapping screw (B-type)	–
		C.P.B-tite (P2)	Self tapping screw (B-type)	Plain washer (type 1)
		C.P.B-tite (S-P2)	Self tapping screw (B-type)	Spring lock washer and plain washer (type 2)
		C.P.S-tite	Self tapping screw (S-type)	–
		C.P.S-tite(O)	Self tapping screw (S-type)	Outside toothed lock washer
		C.P.S-tite(P4)	Self tapping screw (S-type)	Plain washer (type 4)
		C.P.T-B	Self tapping screw	–

Quick reference

This Quick Reference will direct you to key areas of this Chapter. For a complete listing of topics, see the Contents at the front of this manual.

Replacing the Mechanism assembly *page 6-14*

Replacing the Circuit boards *page 6-26*

Replacing the Head unit *page 6-48*

Adjusting and setting the TM-J8000/J8000P printer *page 6-195*

Confidential

Disassembly and Assembly for the TM-J8000/J8000P

Covers and upper case

Cover, carriage assembly

Follow the steps below to disassemble the parts.

1. Open the **Cover, carriage assembly**, using the tabs on both sides of it. When you open the cover, pull it toward you a little, as shown below, then lift it up.

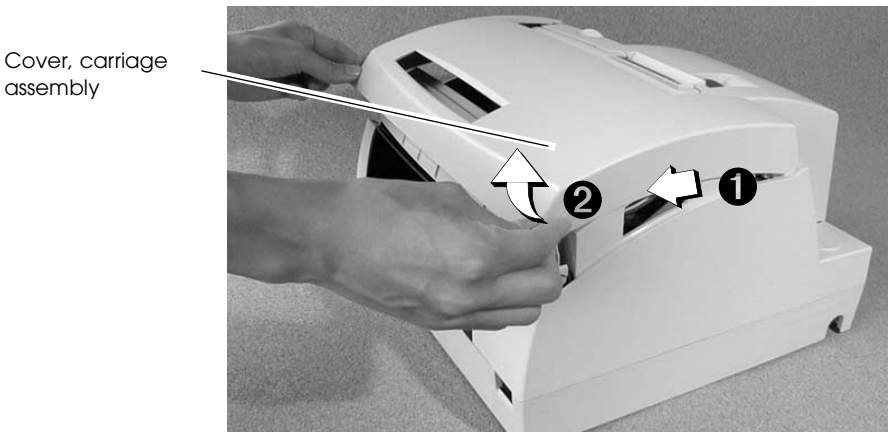


Figure 6-1 Open the Cover, carriage assembly

2. Unhook the **Cover, carriage assembly** by pressing the part where the cover is mounted; then push the cover backward to remove it.

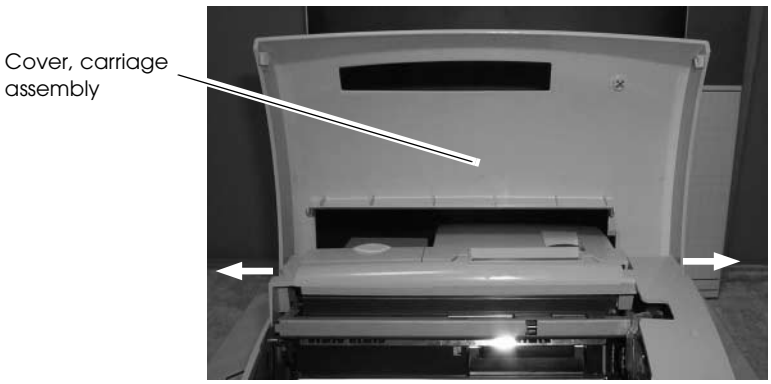


Figure 6-2 Removing the Cover, carriage assembly

To install, reverse the removal procedure. Read the following note before installation.

Note for installation:
After installing the ***Cover, carriage assembly****, lubricate with G-36 on the both sides of the tabs on the* ***Case, upper assembly****.*

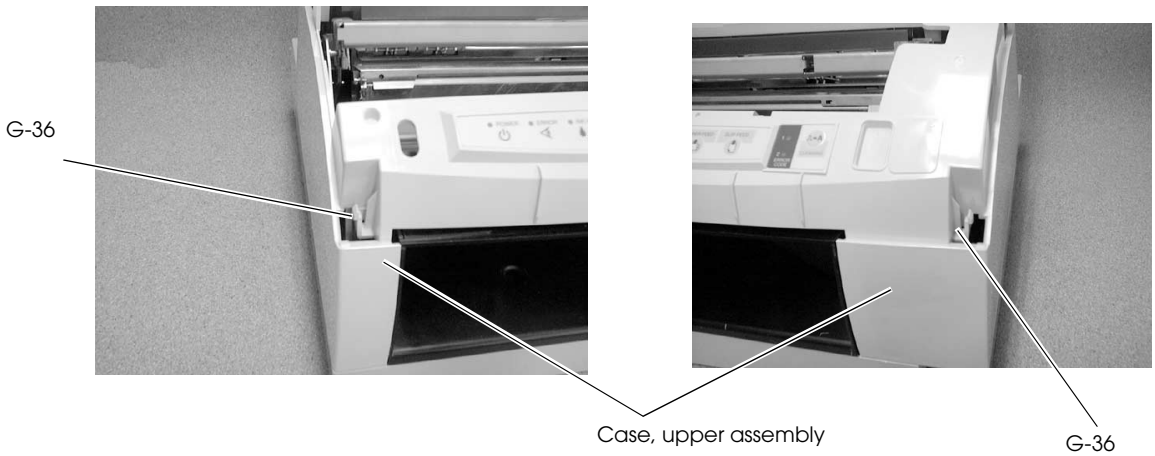


Figure 6-3 Luburicating with G-36

Cover, cartridge assembly

Follow the steps below to disassemble the parts.

1. Open the **Cover, carriage assembly**.
2. Push the mounts inward and remove the **Cover, cartridge assembly**.

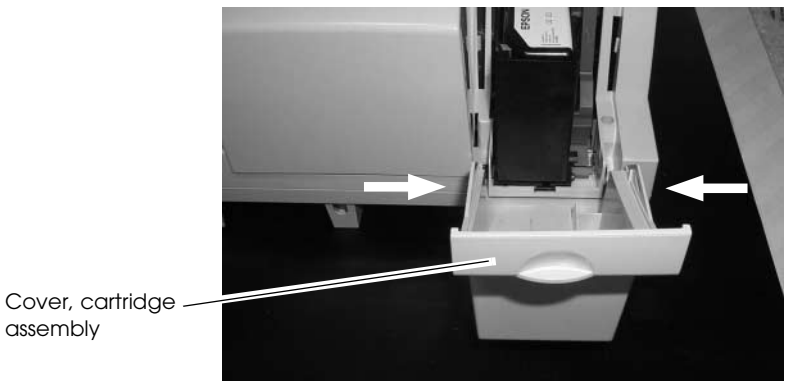


Figure 6-4 Removing the Cover, cartridge assembly

To install, reverse the removal procedure.

Cover, roll paper

Follow the steps below to disassemble the parts.

1. Pull the lever forward and open the **Cover, roll paper**.

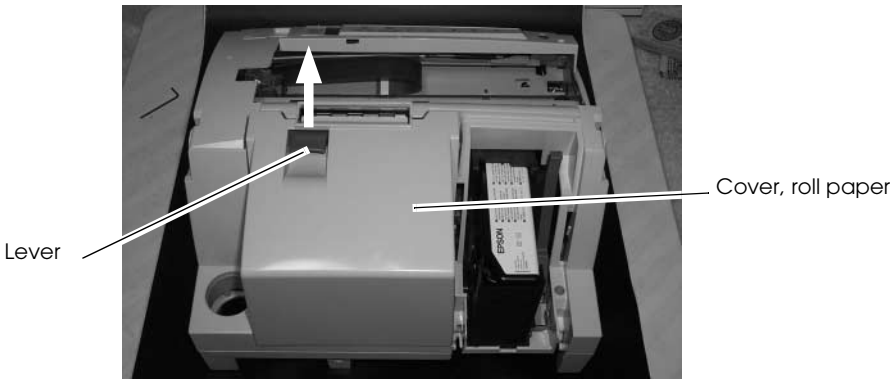


Figure 6-5 Opening the Cover, roll paper

2. Remove two screws (C.C.S-tite, 3 x 16).

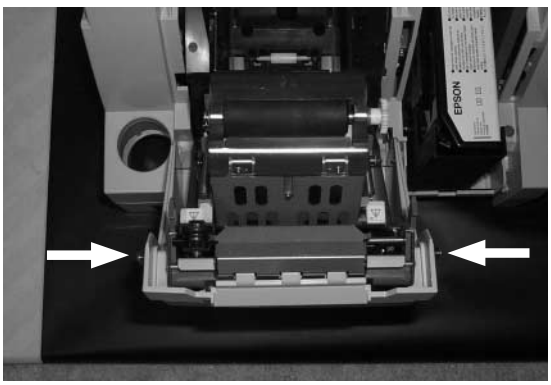


Figure 6-6 Removing the screws

3. Release the two tabs and pull the **Cover, roll paper** back; then remove the cover.

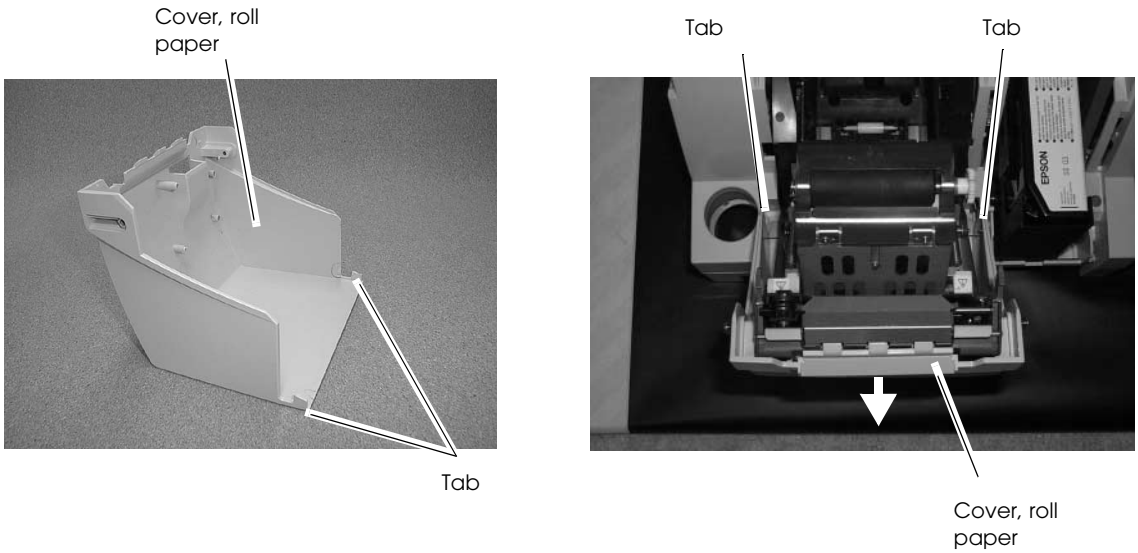


Figure 6-7 Removing the Cover, roll paper

To install, reverse the removal procedure.

Case, upper assembly

Follow the steps below to disassemble the parts.

1. Remove the three screws (C.P.T-B, 3 x 10).

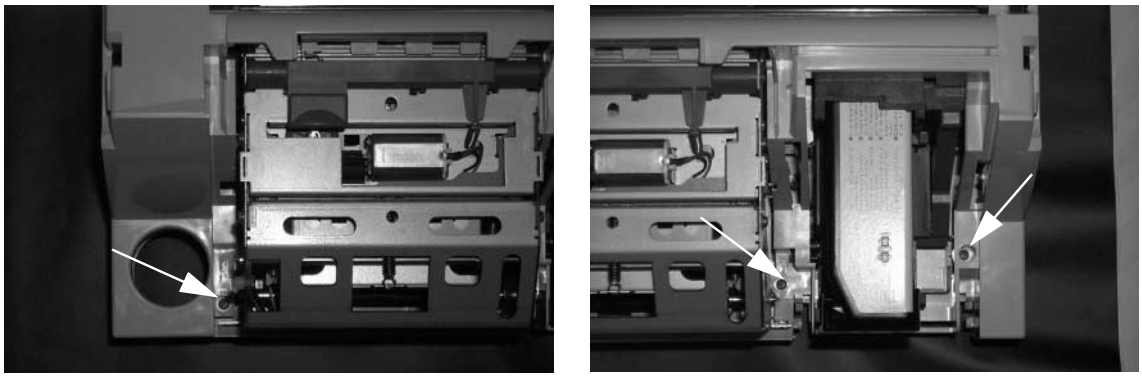


Figure 6-8 Removing the screws

2. While pressing the two positions shown on the front panel to release the tabs inside the case, lift up the **Case, upper assembly** about 10 cm (4 inches).

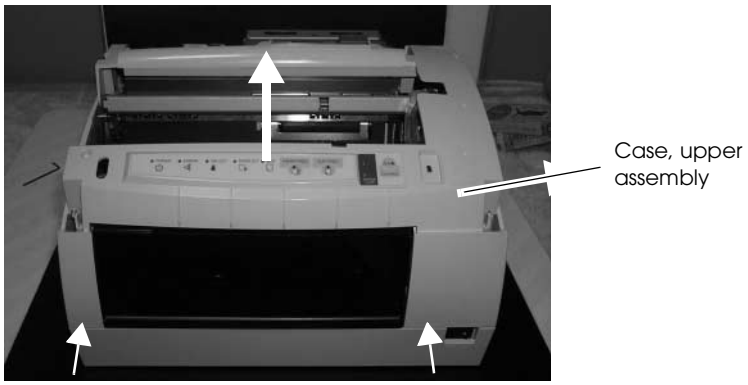


Figure 6-9 Removing the Case, upper assembly

3. Put the **Case, upper assembly** down beside the printer.

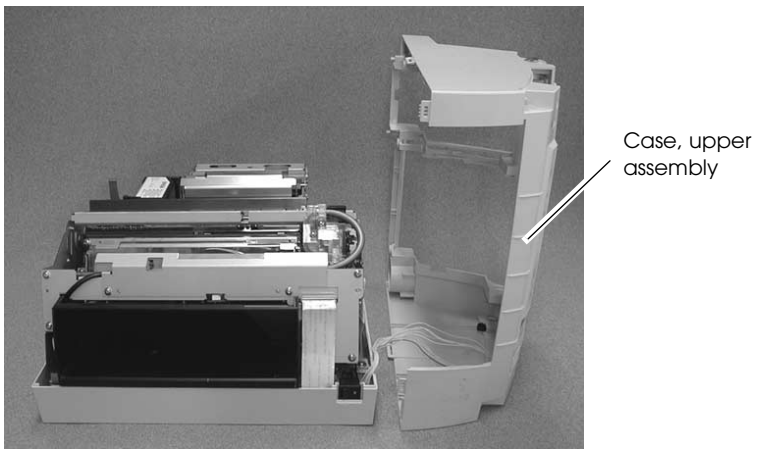


Figure 6-10 Putting the Case, upper assembly down by the printer

4. Remove the three screws (C.P.T-B, 3 x 10), three plain washers (3 x 8 x 10), and three **Spacers, board**; then detach the **Switch board assembly** from the **Case, upper assembly**.

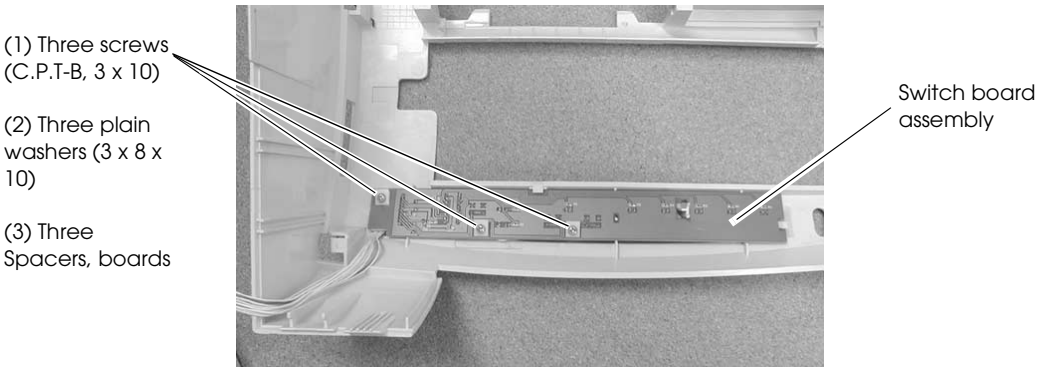


Figure 6-11 Removing the Switch board assembly

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *Before you install the* **Cover, upper assembly**, *you may need to perform an adjustment depending on what you have replaced. See the "Settings and adjustments" section in this chapter for more information.*

2. *Make sure that the wires of the* **Switch board assembly** *are not caught by the* **Case, upper assembly**.

3. *During installation of the* **Switch board assembly**, *arrange the cables so the wires come out from the slit shown below.*

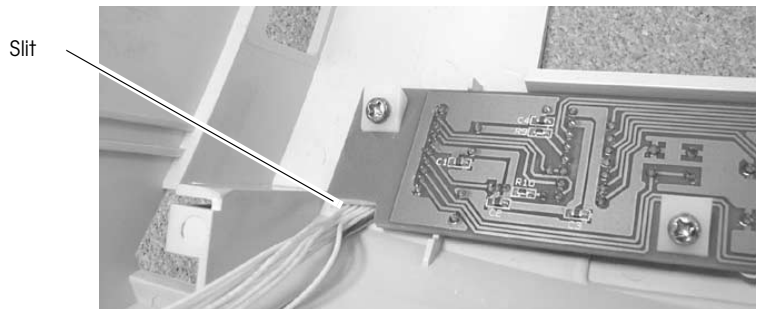


Figure 6-12 Cable arrangement

4. *During installation of the* **Switch board assembly**, *hook the tab on the side as shown below; then hook the center one.*

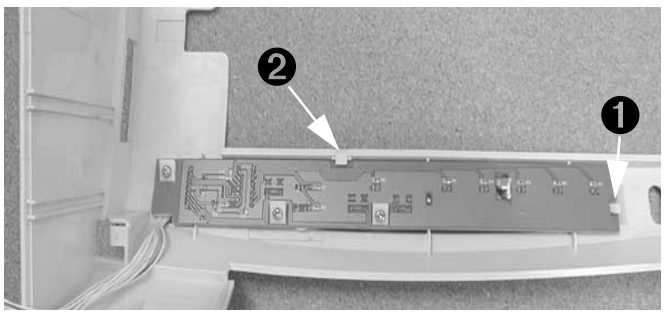


Figure 6-13 Tabs on the Case, upper assembly

5. *During installation of the* **Switch board assembly,** *install the* **Spacers, board** *with the angle shown below.*

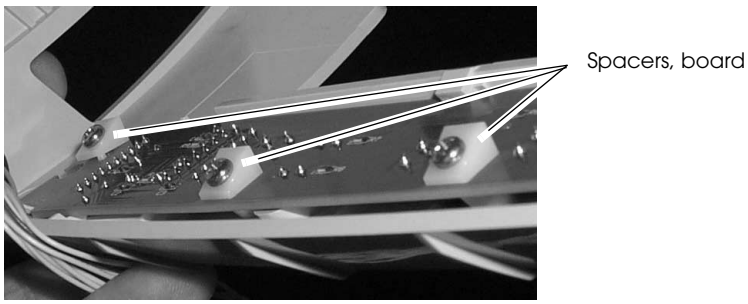


Figure 6-14 Angle of the Spacers, board

6. *Make sure that the wires for the* **Switch board assembly** *are arranged under the SW cable assembly as shown below.*

Figure 6-15 Arranging the cable of the the Switch board assembly

Mechanism assembly, M-J8000

Follow the steps below to disassemble the parts.

1. Remove the covers and the **Case, upper assembly**. See the “Covers and upper case” section in this chapter.

2. Remove the **Sheet, FFC**.

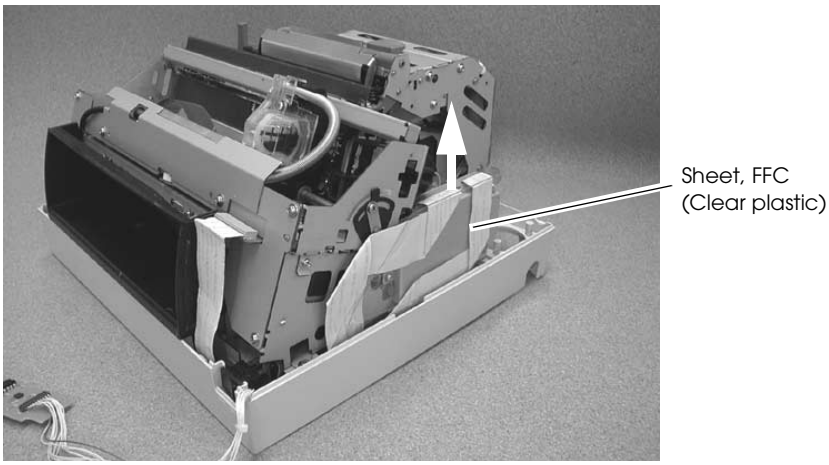


Figure 6-16 Removing the Sheet, FFC

3. Disconnect the **FFC, L**, **FFC, R,** and **FFC, head** from the **Mechanism assembly, M-J8000**.

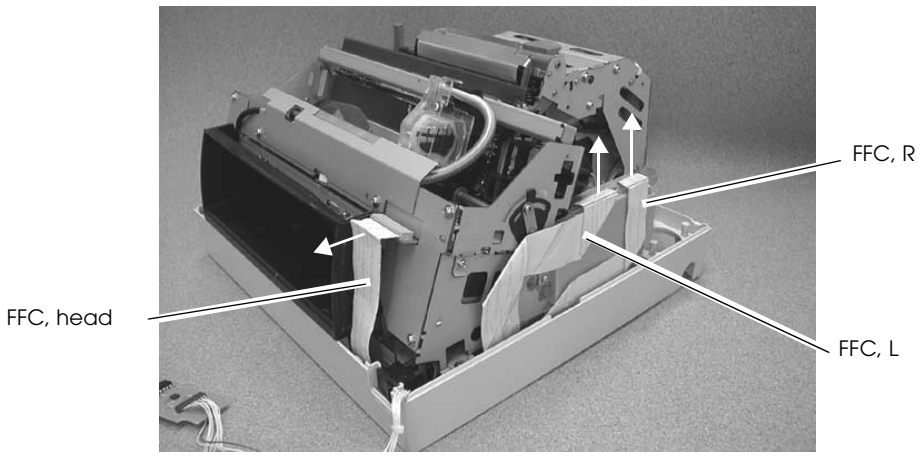


Figure 6-17 Disconnecting the FFCs

4. Remove the two screws (C.P.S-tite (O), 3 x 6) and remove the connector box.

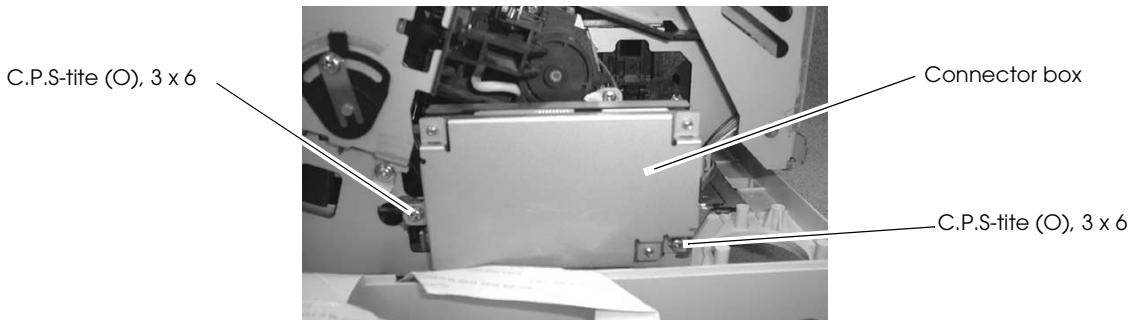


Figure 6-18 Removing the connector box

5. Turn the gear to open the shutter.

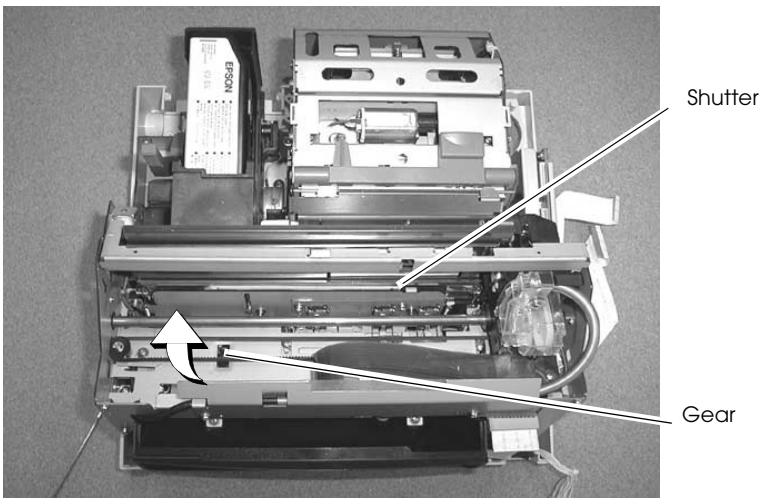


Figure 6-19 Opening the shutter

6. Lift up the head carriage lock using a flat head screwdriver or similar tool.

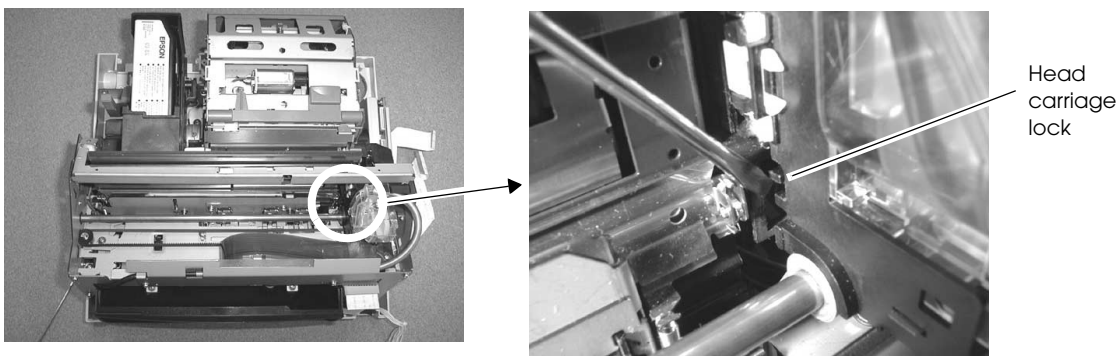


Figure 6-20 Unlocking the head carriage lock

7. Move the head carriage to the left and remove the six screws.

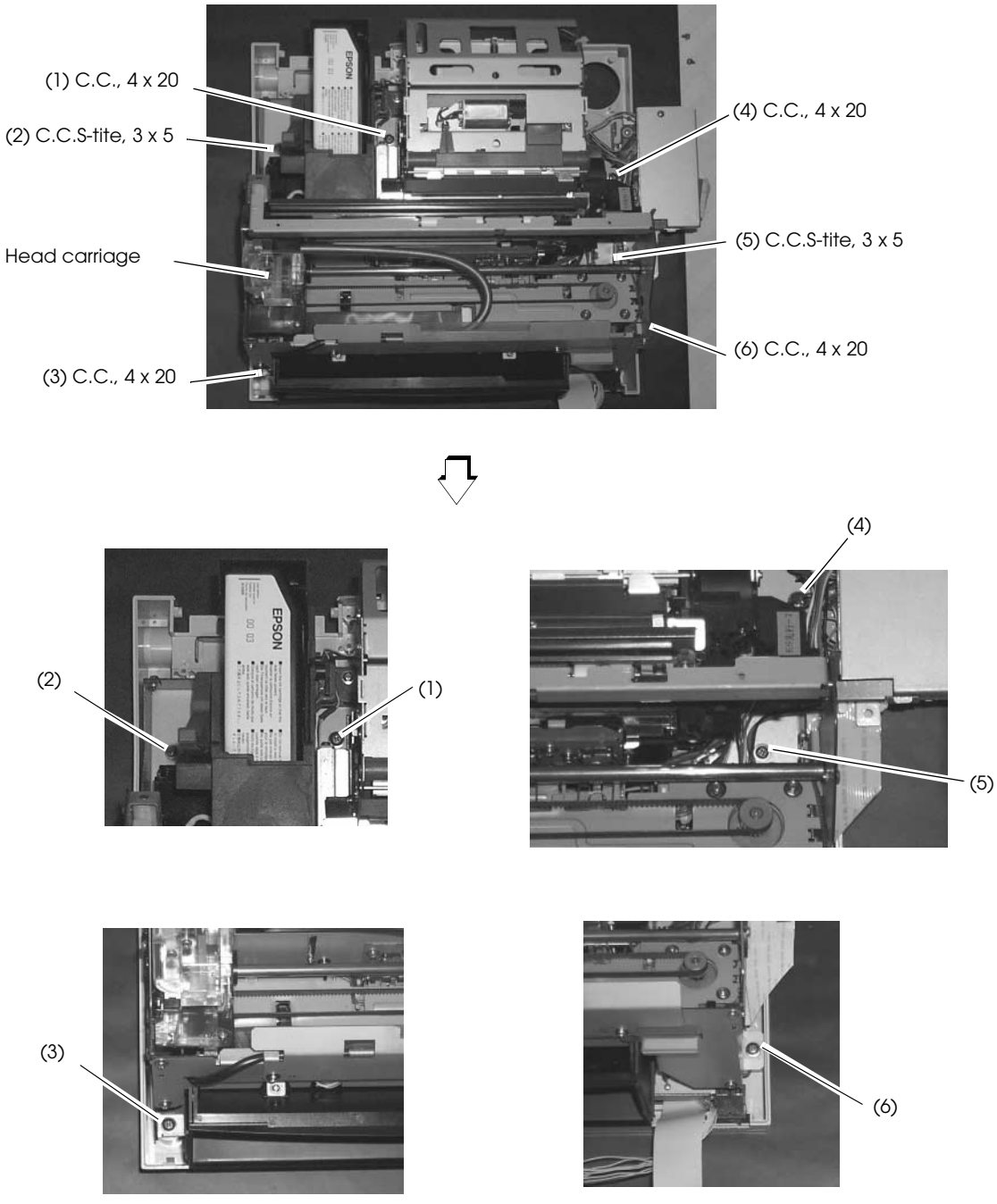


Figure 6-21 Removing the six screws

8. Move the head carriage back to the right side as far as it will go. With this operation the ink jet head is capped to keep the head from drying out.

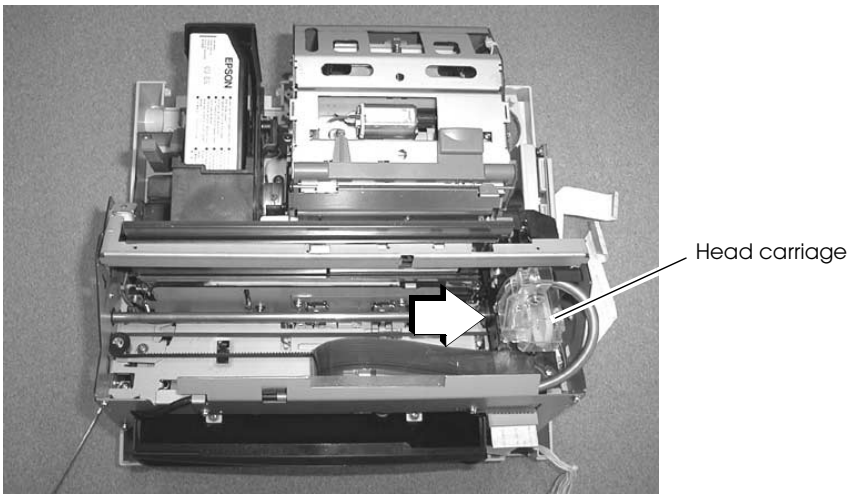


Figure 6-22 Capping the ink jet head

9. Open the paper roll cover, and remove one screw (C.B.S-tite, 3 x 6).

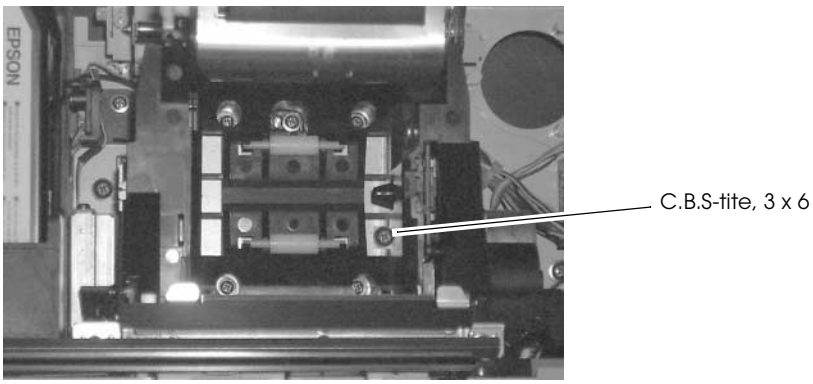


Figure 6-23 Removing the screw

10. Lift the **Mechanism assembly, M-J8000** and remove it.

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *Make sure that no cables are caught during installation.*
2. *While installing the* ***Mechanism assembly, M-J8000****, insert the two dowels on the* ***Plate, main assembly*** *into the two holes in the* ***Mechanism assembly, M-J8000****.*

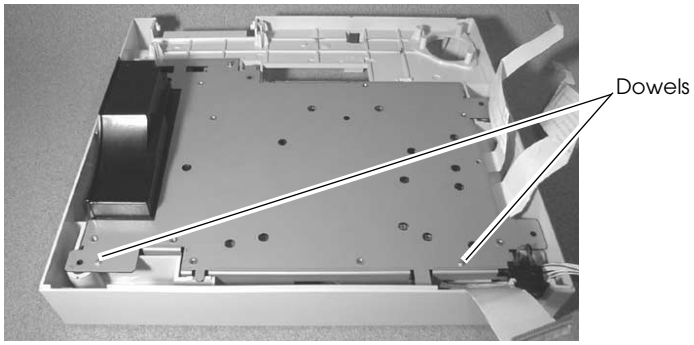


Figure 6-24 Dowels on the Plate, main assembly

3. *Before you secure the* ***Mechanism assembly, M-J8000****, lubricate the two screws shown in the illustration below with O-10. This is important to protect the* ***Main circuit board unit*** *from the metallic particles from the screw holes.*

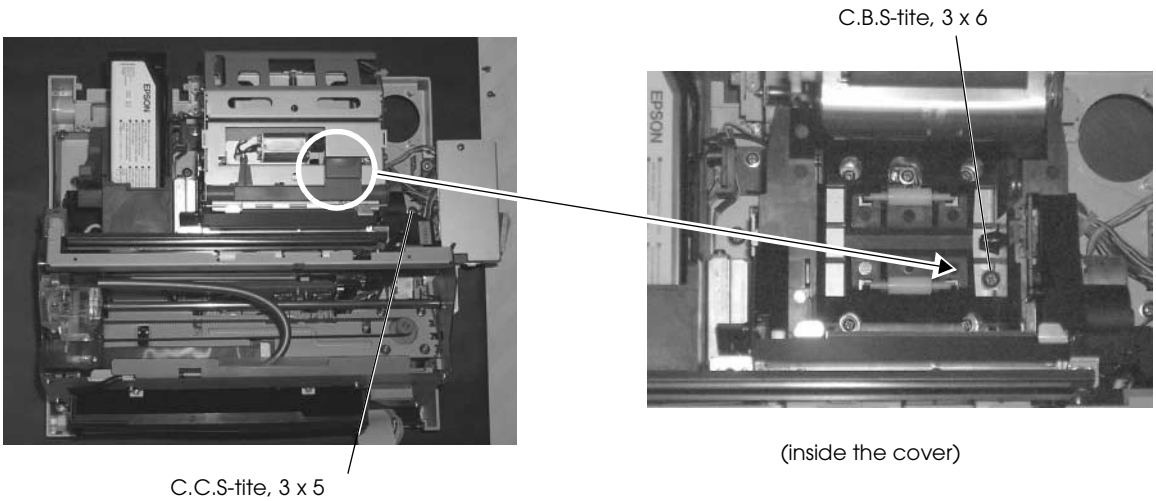


Figure 6-25 Lubricating the screws

4. *To install the connector box, hook the tab (marked with a "1") first and slide the box to the left; then set the tab (marked with a "2").*

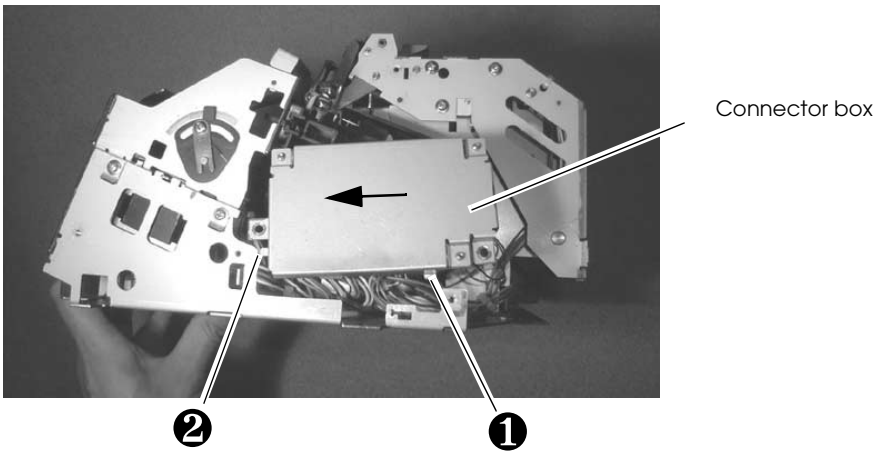


Figure 6-26 Installing the connector box

Case, lower assembly

Follow the steps below to disassemble the parts.

1. Remove the covers and **Case, upper assembly**. See the "Covers and upper case" section in this chapter.

2. Remove the **Mechanism assembly, M-J8000**. See the "Mechanism assembly, M-J8000" section in this chapter.

3. Remove two **Hexagon socket head bolts, 3 x 5** and three C.B.S-tite, 3 x 6 screws. To remove the **Hexagon socket head bolts, 3 x 5**, use a hexagonal driver (2.5 mm).

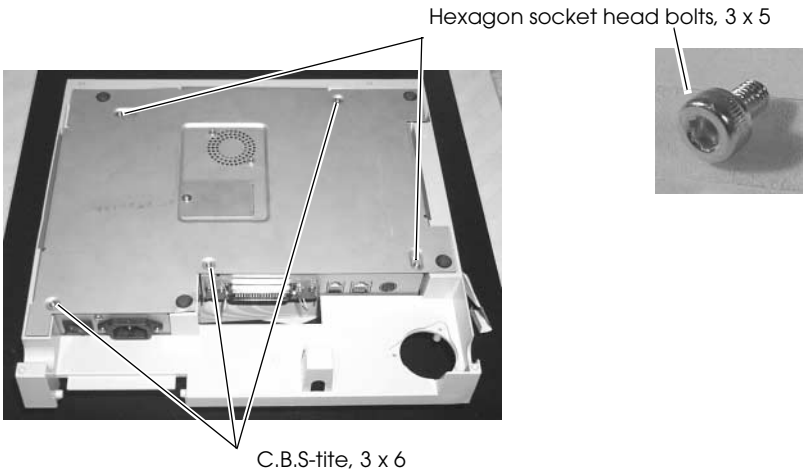


Figure 6-27 Removing the bolts

4. Lift one side of the **Plate, lower assembly** as shown and disconnect the fan cable; then remove the **Plate, lower assembly**. Lift up the **Case, lower assembly**.

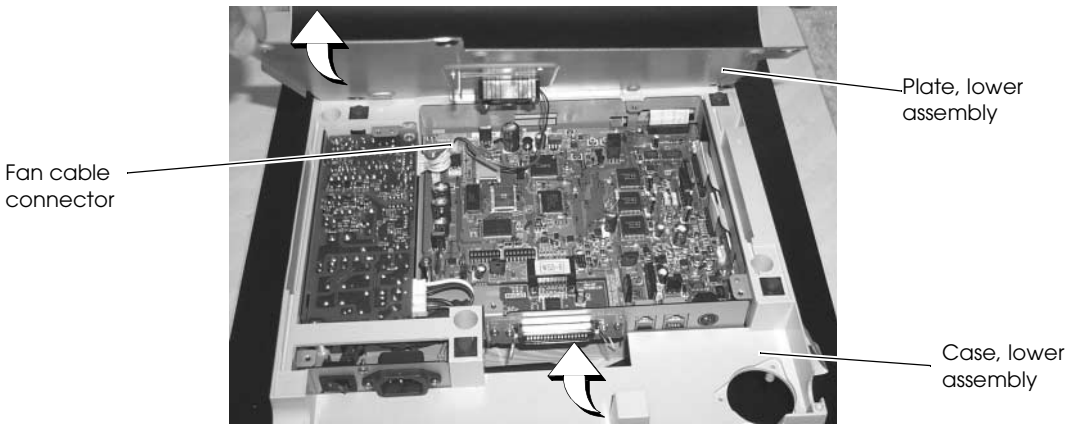


Figure 6-28 Removing the Plate, lower assembly

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *Make sure that no cables are caught during installation.*
2. *When you install the* ***Plate, main assembly*** *on the* ***Case, lower assembly****, make sure you have installed the four* ***Clamps****; then tilt the* ***Plate, main assembly*** *with the AC inlet side down, and install the* ***Plate, main assembly****.*

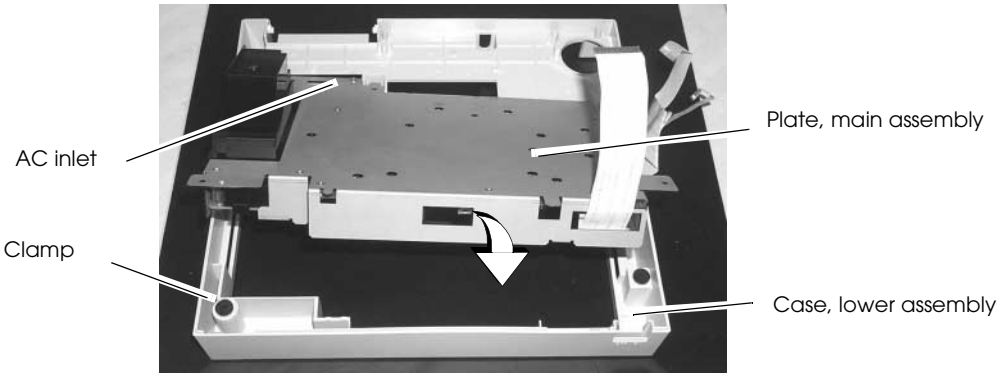


Figure 6-29 Installing the Plate, main assembly on the Case, lower assembly

3. *When you install the* ***Plate, lower assembly****, make sure the fan cable does not touch the fins of the fan.*

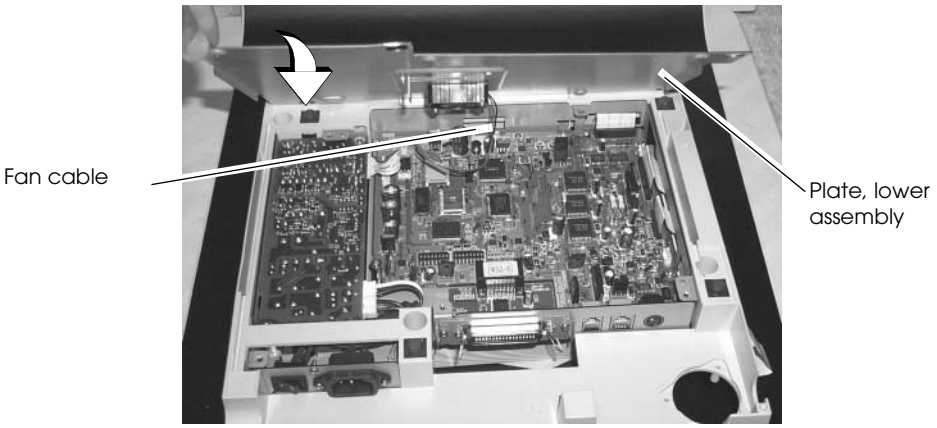


Figure 6-30 Fan cable

Cables

Follow the steps below to disassemble the parts.

1. Remove the covers and the **Case, upper assembly**. See the “Covers and upper case” section in this chapter.
2. Remove the **Mechanism assembly, M-J8000**. See the “Mechanism assembly, M-J8000” section in this chapter.
3. Remove the **Case, lower assembly**. See the “Case, lower assembly” section in this chapter.
4. Disconnect the **FFC, L**, **FFC, R**, **FFC, head**, **Power switch assembly**, **Switch board assembly**, and **DC cable assembly**.

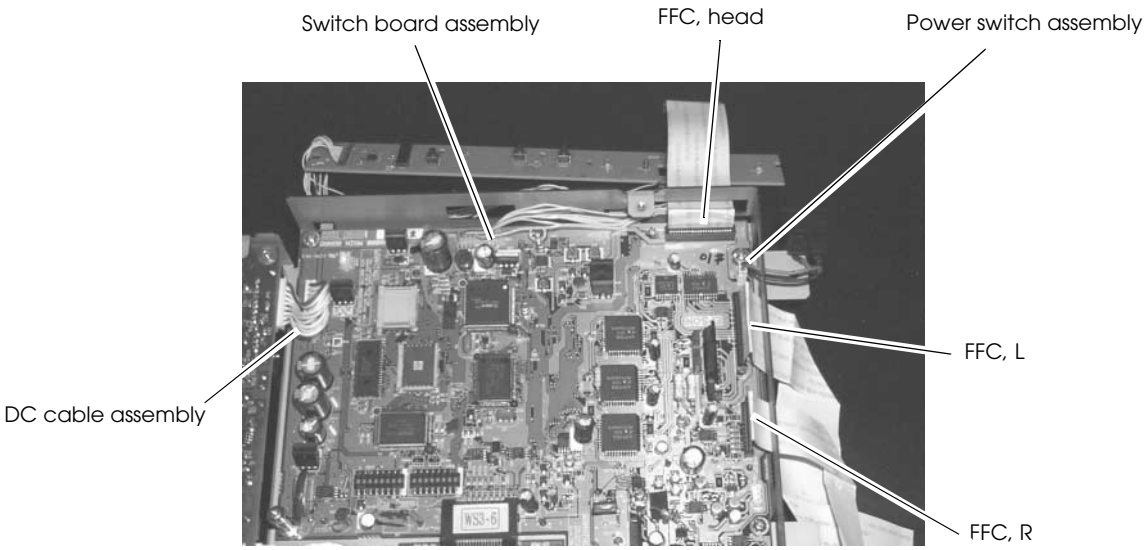


Figure 6-31 Disconnecting the Cables

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *Fold the* ***FFC, L*** *as shown below. Fold it so that the dotted lines shown in the illustration are on the outside, not the inside, of the fold.*

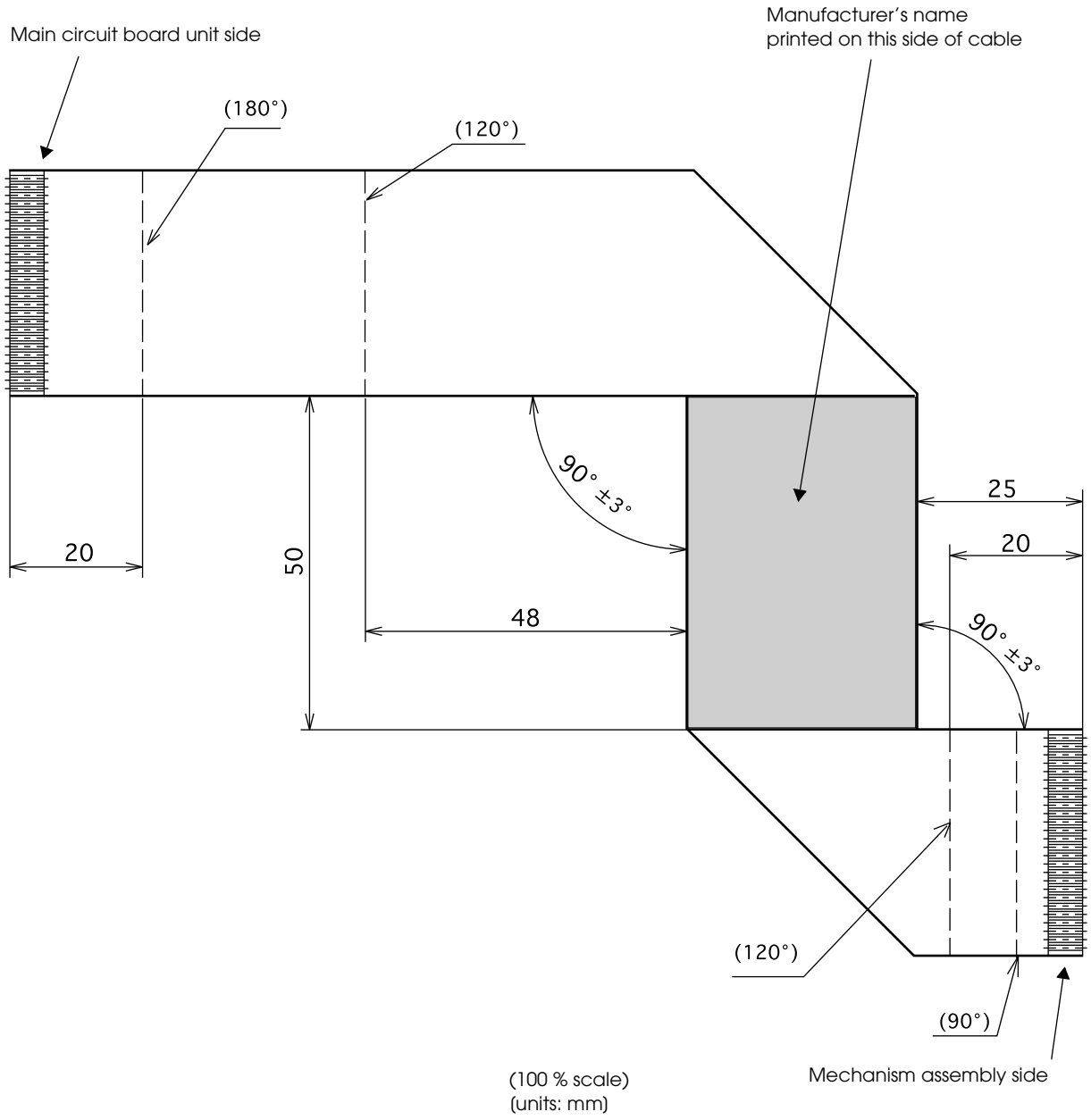


Figure 6-32 Folding the FFC, L

2. *Fold the **FFC, R** as shown below. Fold it so that the dotted lines shown in the illustration are on the outside, not the inside, of the fold.*

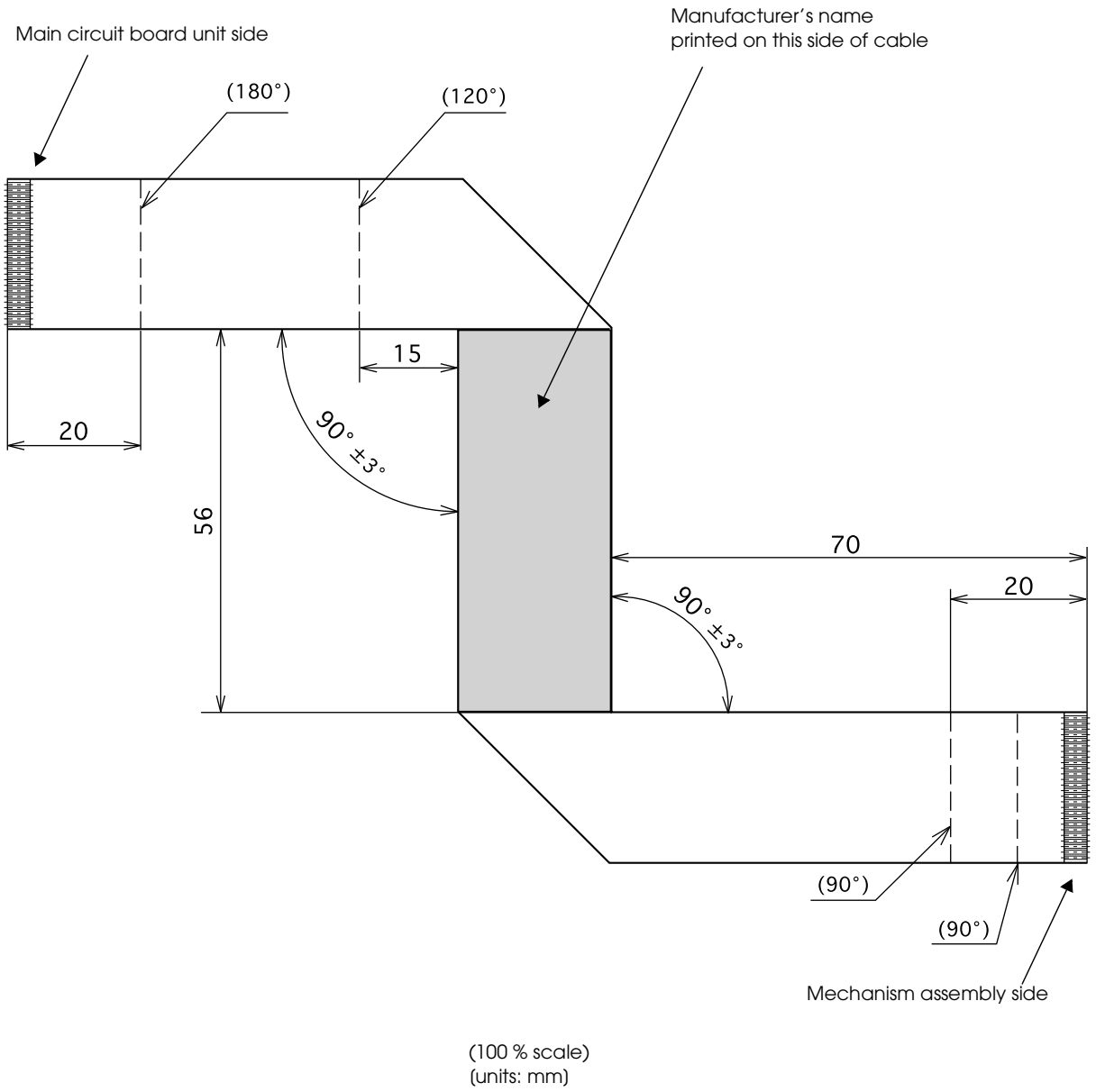


Figure 6-33 Folding the FFC, R

3. *Make sure that you pass the* ***FFC, head*** *and* ***Switch board assembly*** *through the slit shown with (1) in the illustration below, and pass the* ***FFC, L****,* ***FFC, R****, and* ***Power switch assembly*** *through the slit shown with (2) in the illustration.*

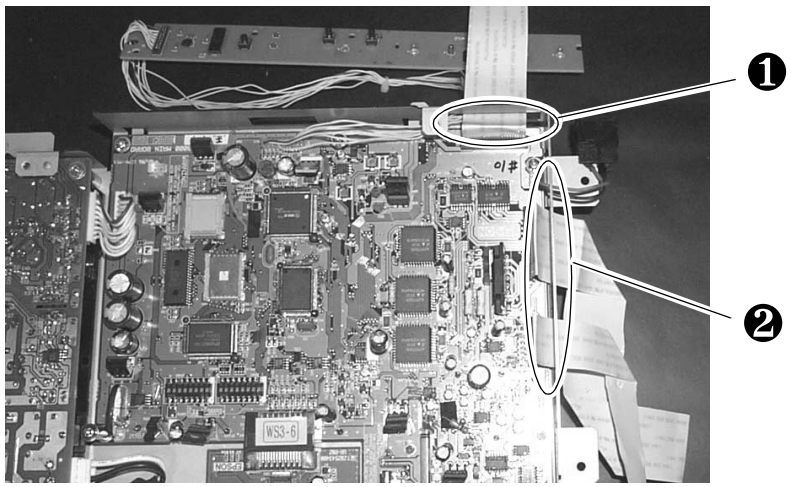


Figure 6-34 Slits for the Cables

Circuit boards

Follow the steps below to disassemble the parts.

1. Turn printer on its side with the ink cartridge side facing down.

> ⚠ ***CAUTION:***
>
> *Do not turn the printer upside down since it may cause ink to leak. After turning the printer back upright, check whether it prints properly.*

Figure 6-35 Turning the printer

2. Remove two screws (C.P.(O), 3 x 8) and pull out the I/F circuit board unit.

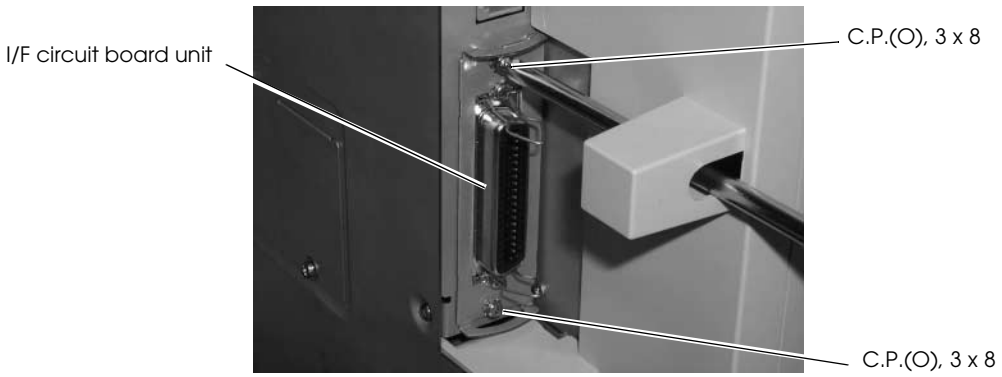


Figure 6-36 Removing the I/F circuit board unit

3. Remove two **Hexagon socket head bolts, 3 x 5** and three C.B.S-tite, 3 x 6 screws. To remove the **Hexagon socket head bolts, 3 x 5**, use a hexagonal driver (2.5 mm).

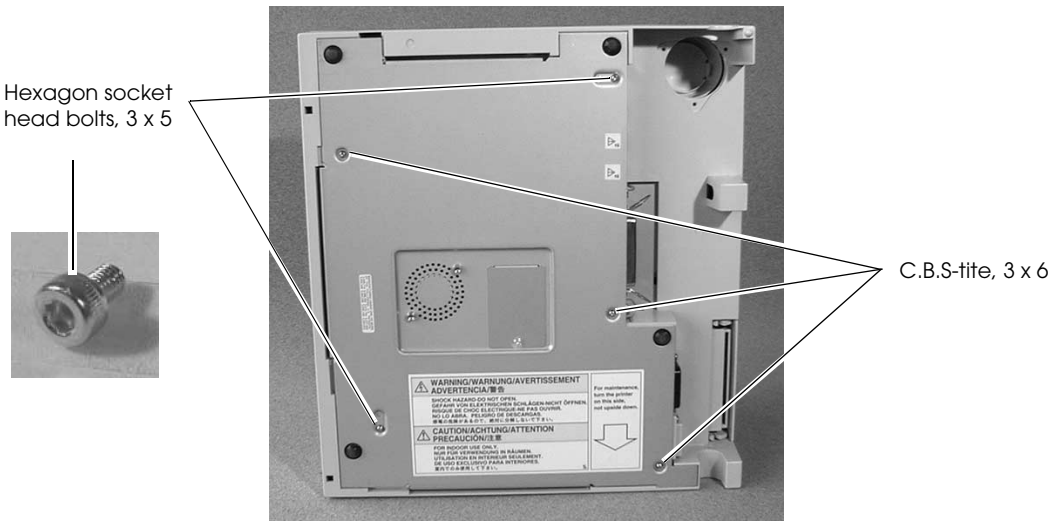


Figure 6-37 Removing the bolts

4. Disconnect the fan cable and remove the **Plate, lower assembly**.

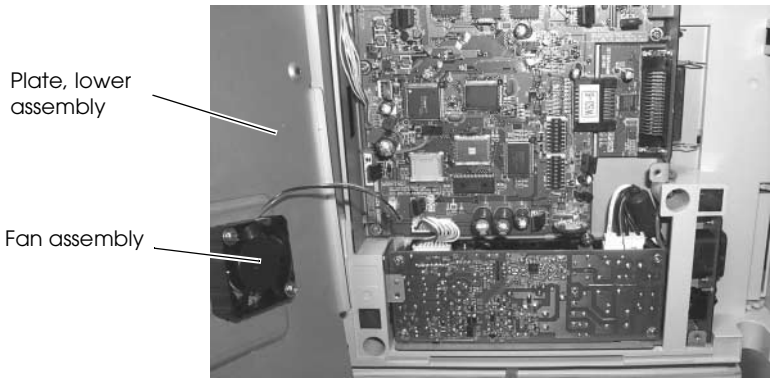


Figure 6-38 Removing the Plate, lower assembly

5. Disconnect the **FFC, L**, **FFC, R**, **FFC, head**, **Power switch assembly**, **Switch board assembly**, and **DC cable assembly**.

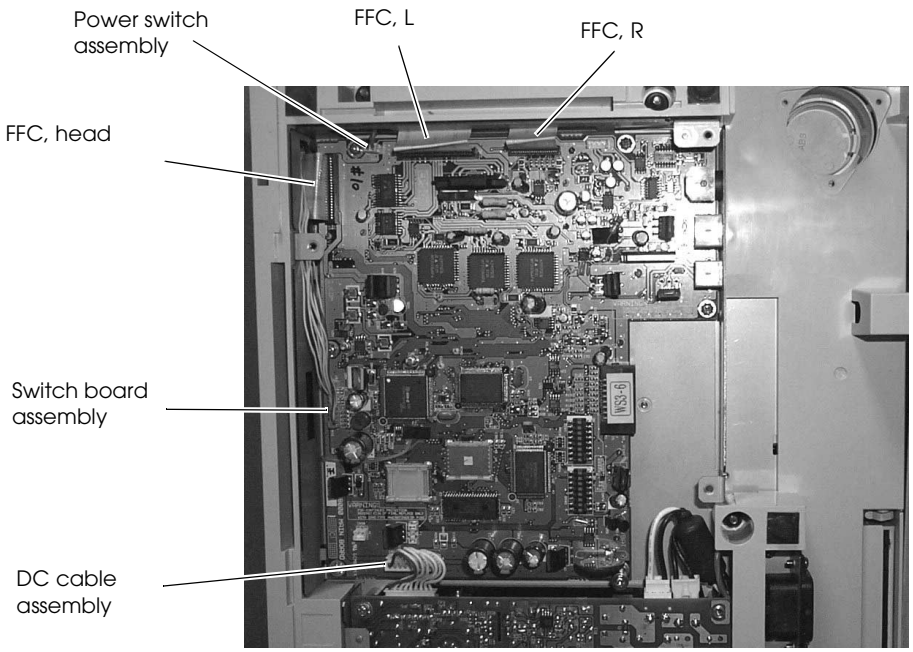


Figure 6-39 Disconnecting the cables

6. Remove one long screw (C.C., 3 x 30) and the **Spacer** next to the battery. Remove the other five screws (C.P.(O), 3 x 8); then remove the **Main circuit board unit**.

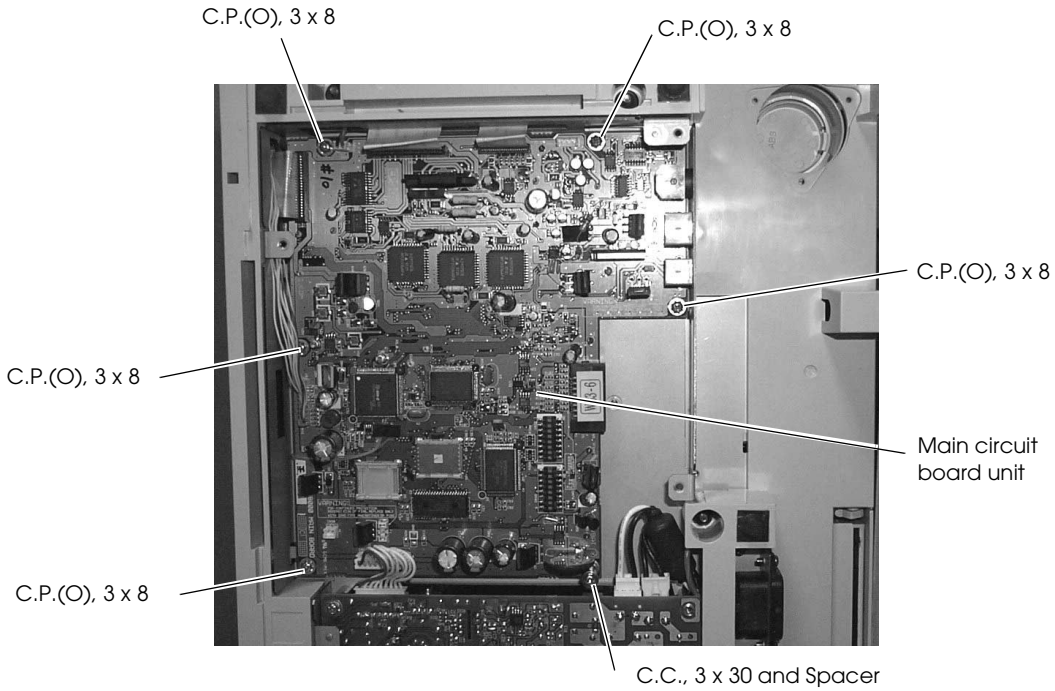


Figure 6-40 Removing the Main circuit board unit

⚠CAUTION:

A lithium battery is mounted on the Main circuit board unit. Do not short the terminals of this battery.

7. Put you finger under the connector and press the tab to unlock the connector; then pull out the connector. Disconnect the other connector with the same way.

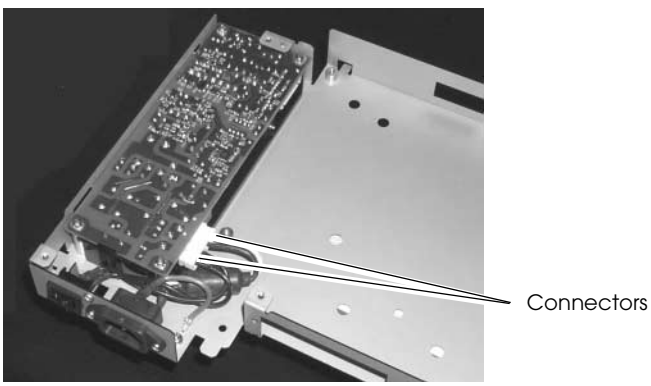


Figure 6-41 Disconnecting the connectors

8. Remove four screws (C.P.(O), 3 x 8).

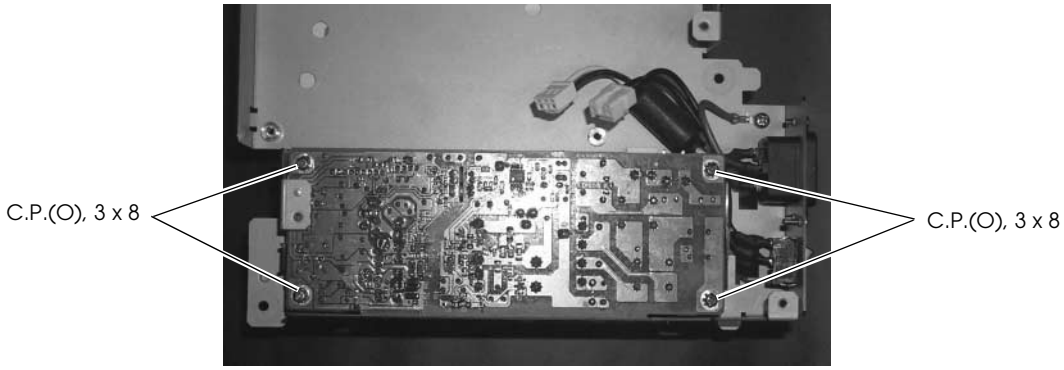


Figure 6-42 Removing the screws

9. Lift up the one side of the **Power circuit board assembly**, and remove it.

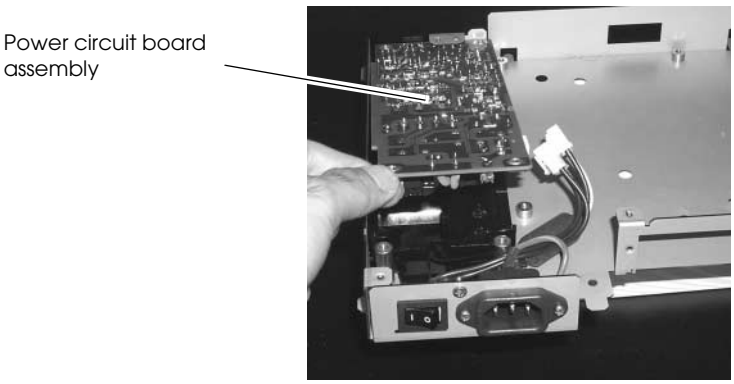


Figure 6-43 Removing the Power circuit board assembly

To install, reverse the removal procedure. Read the following note before installation.

Note for installation:

1. *If you have replaced the* ***Main circuit board unit****, you need to set DIP switches on the board. See the "Settings and adjustments" section in this chapter for more information.*

2. *When installing the* ***Power circuit board assembly*** *into the* ***Cover, power board****, take care not to bend the parts shown in the following illustration.*

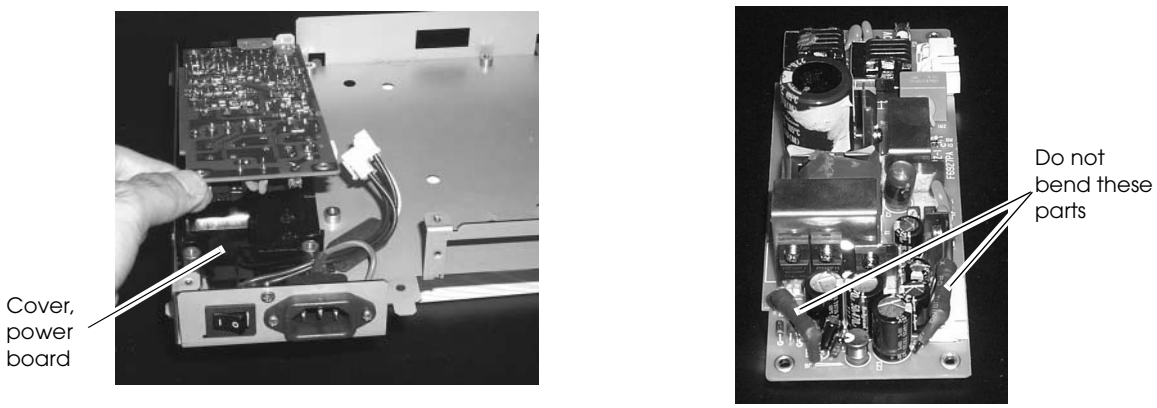


Figure 6-44 Parts on the Power circuit board assembly

Fan assembly

Follow the steps below to disassemble the parts.

1. Turn printer on its side with the ink cartridge side facing down.

> ⚠ ***CAUTION:***
>
> *Do not turn the printer upside down since it may cause ink to leak. After turning the printer back upright, check whether it prints properly.*

Figure 6-45 Turning the printer

2. Remove two **Hexagon socket head bolts, 3 x 5** and three C.B.S-tite, 3 x 6 screws. To remove the **Hexagon socket head bolts, 3 x 5**, use a hexagonal driver (2.5 mm).

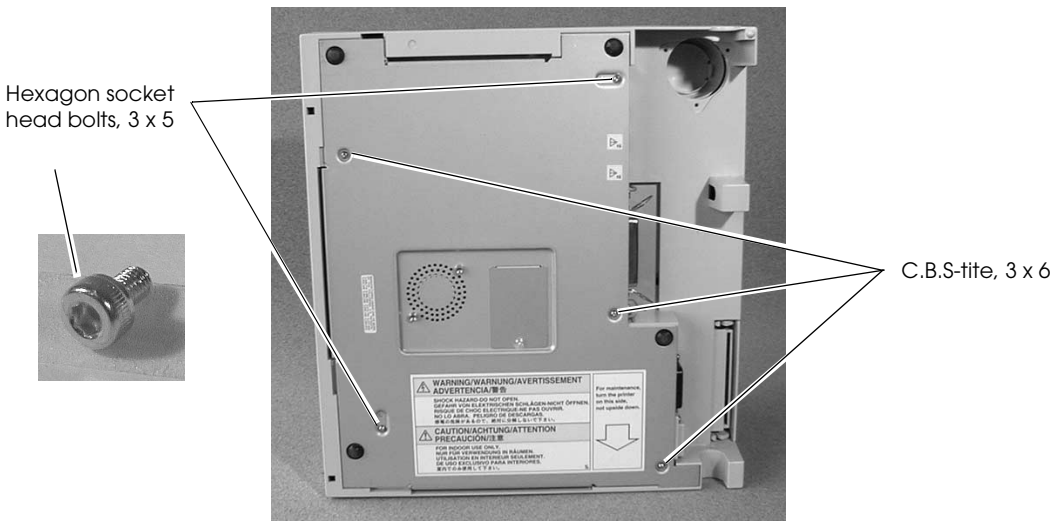


Figure 6-46 Removing the bolts

3. Disconnect the fan cable and remove the **Plate, lower assembly**.

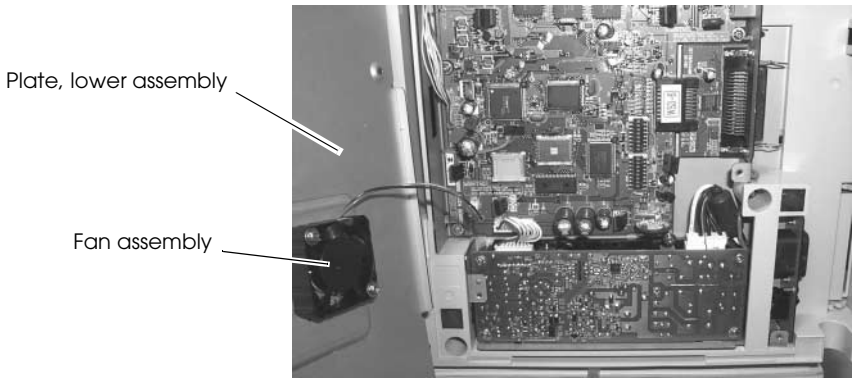


Figure 6-47 Removing the Plate, lower assembly

4. Remove the two screws (C.C.S-tite, 3 x 16); then remove the **Fan assembly**.

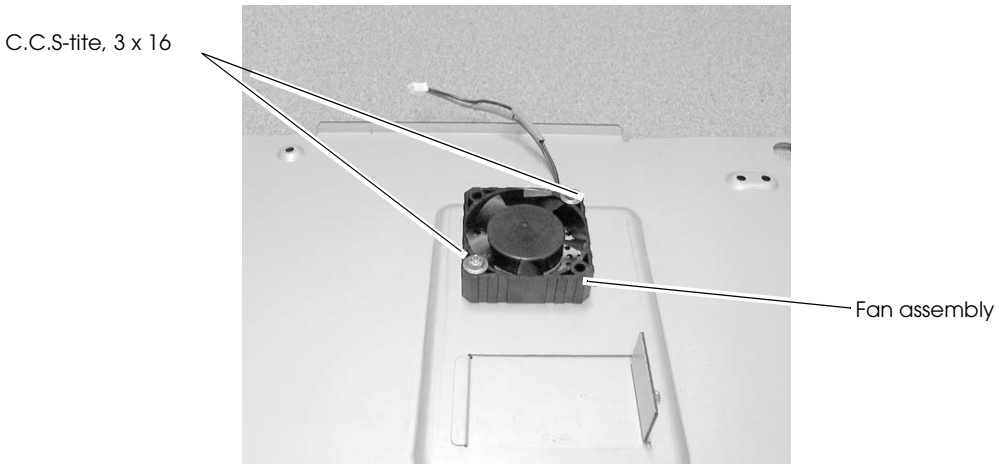


Figure 6-48 Removing the Fan assembly

To install, reverse the removal procedure. Read the following note before installation.

Note for installation:

1) When installing the ***Fan assembly****, install it so the label-side is down and so the cable comes out as shown in the illustration below.*

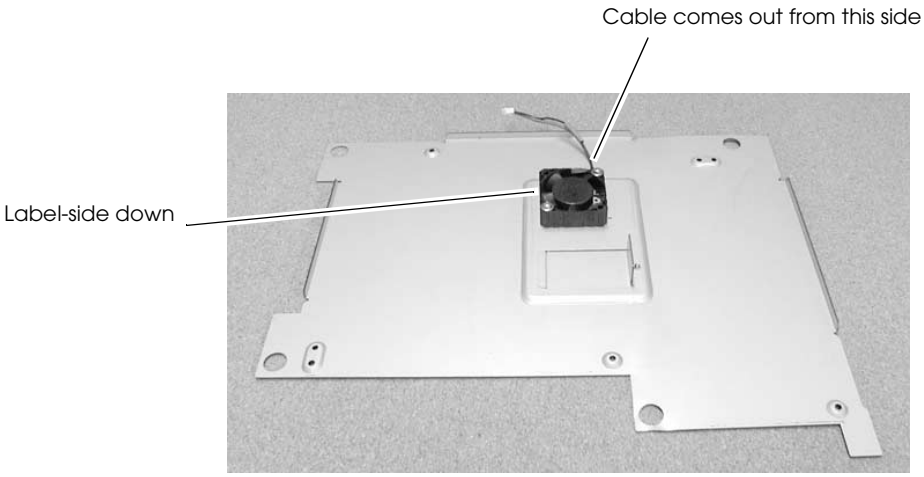


Figure 6-49 Direction of the Fan assembly

Disassembly and assembly for the mechanism assembly, M-J8000

Connector box (Connector board)

Follow the steps below to disassemble the connector box.

1. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the "Covers and upper case" section in this chapter.
2. Remove the **Sheet, FFC**.

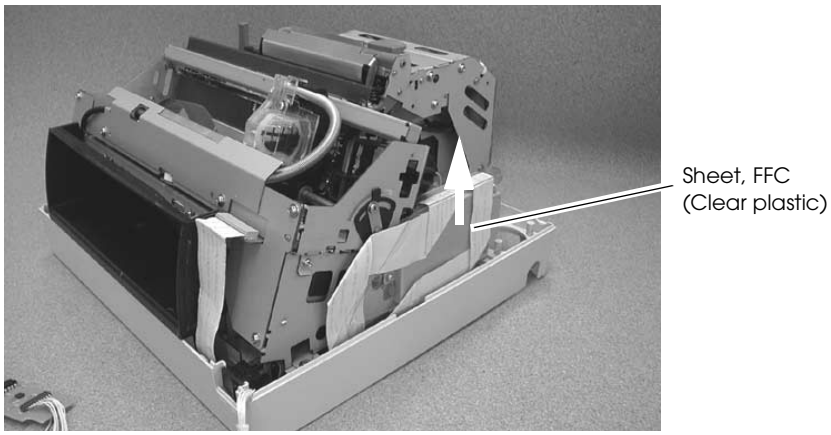


Figure 6-50 Removing the Sheet, FFC

3. Disconnect the **FFC, L** and **FFC, R** from the **Mechanism assembly, M-J8000**.

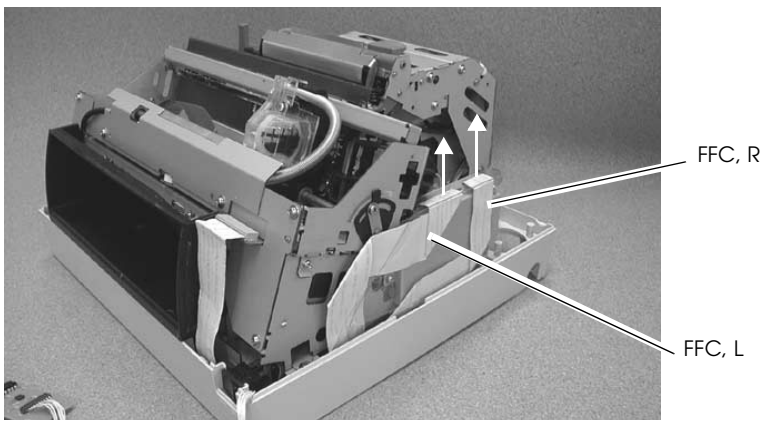


Figure 6-51 Disconnecting the FFCs

4. Remove the two screws (C.P.S-tite (O), 3 x 6) and remove the connector box.

Figure 6-52 Removing the connector box

5. Remove the screw (C.P.S-tite(O), 3 x 6); then remove the **Cover, connector board** by releasing the tab from the slit.

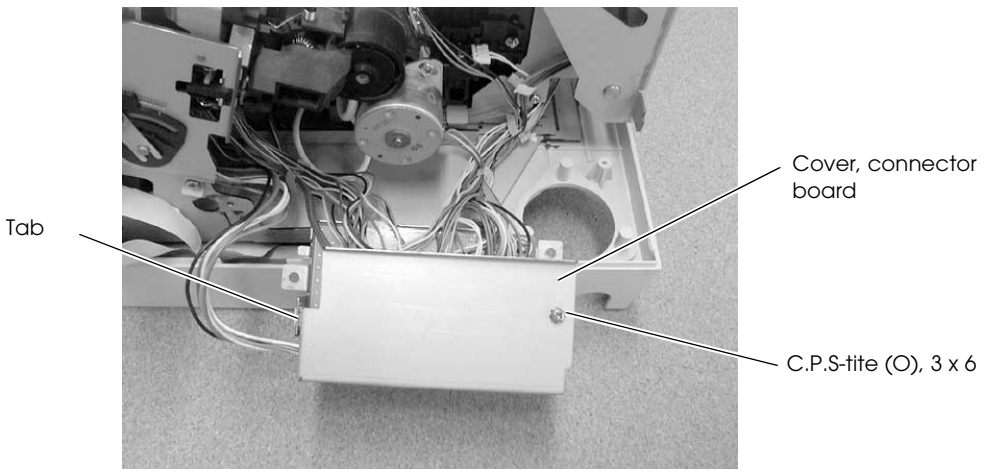


Figure 6-53 Removing the Cover, connector board

6. Disconnect the cables from the **Connector board**.

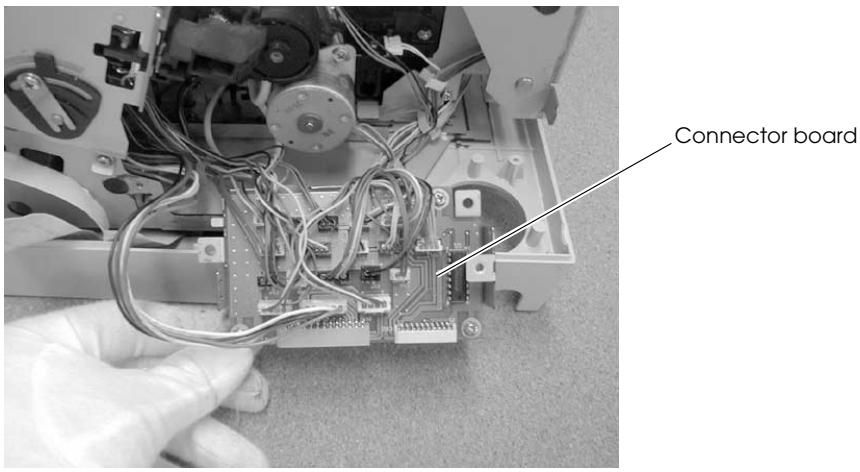


Figure 6-54 Disconnecting the cables

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

*1) To connect the cables on the **Connector board**, find the connector whose number of pins, shape, and color matches; then connect it.*

2) While installing the connector box, make sure that no cables are caught.

3) To install the connector box, hook the tab (marked with "1") first and slide the box to the left; then set the tab (marked with "2").

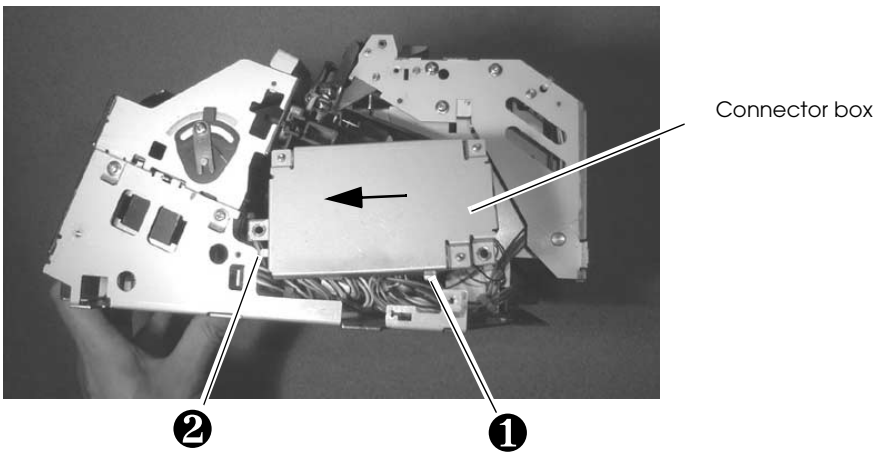


Figure 6-55 Installing the connector box

*4) When you install the **Cover, connector board**, make sure that the cable wires of the carriage motor come out from the slit shown below. Be sure no cables are caught.*

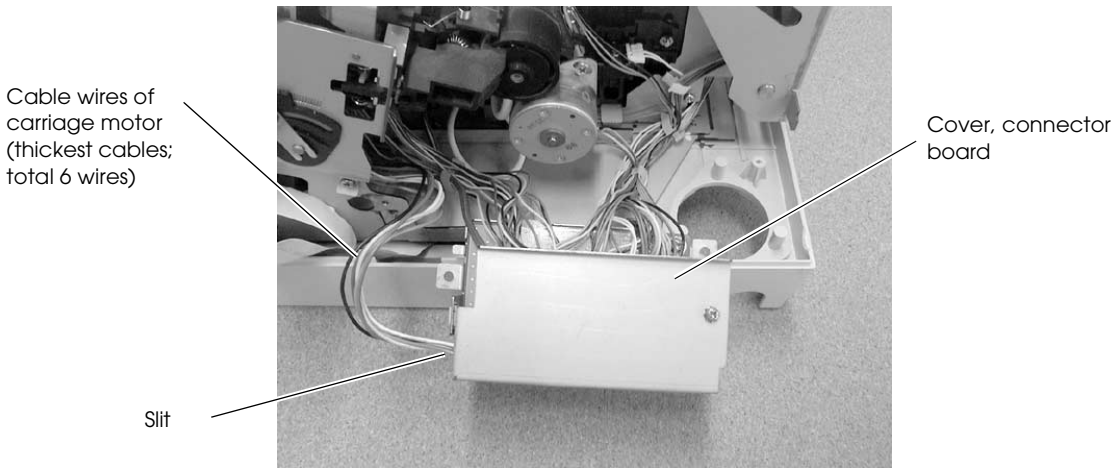


Figure 6-56 Arranging the cables

Pump unit

⚠ *CAUTION:*

To maintain print quality, do not let any objects touch or contact the cap and cleaning plate on the Pump unit.

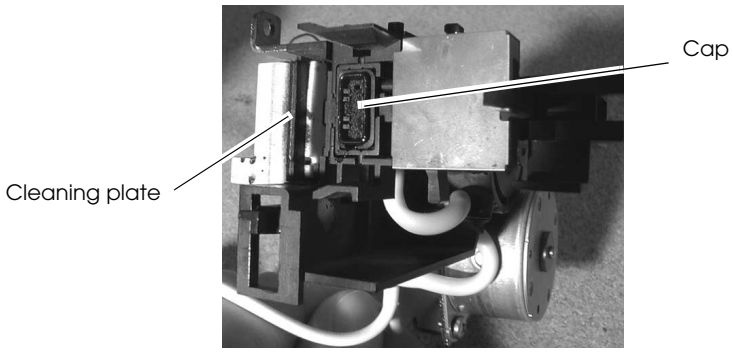


Figure 6-57 Cap and cleaning plate on the Pump unit

Follow the steps below to disassemble the unit.

1. Perform the head exchange sequence using the TM-J8000 Service Utility. See the "Head exchange sequence" section in Chapter 5.

2. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the "Covers and upper case" section in this chapter.

3. Remove the connector box and disconnect the two **Pump unit** cables. See the "Connector box" section in this chapter.

4. Remove the three screws (C.C.S-tite, 3 x 5).

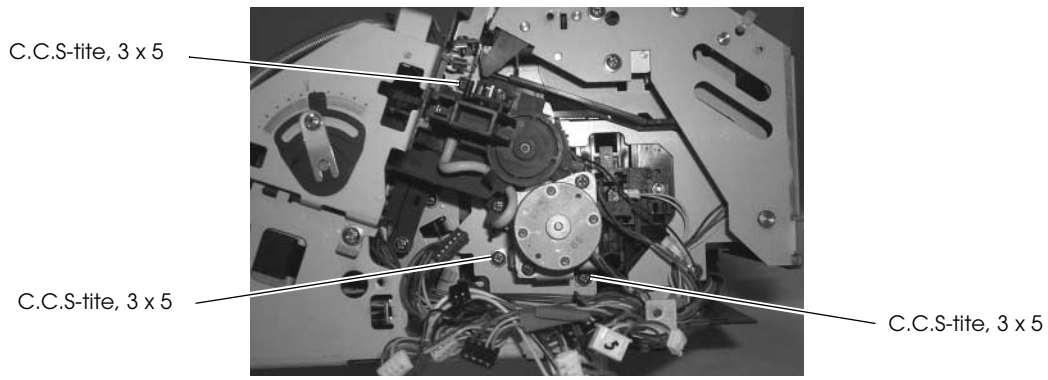


Figure 6-58 Removing the screws

5. Remove the **Tube, waste ink** from the **Pump unit** and remove the **Pump unit**.

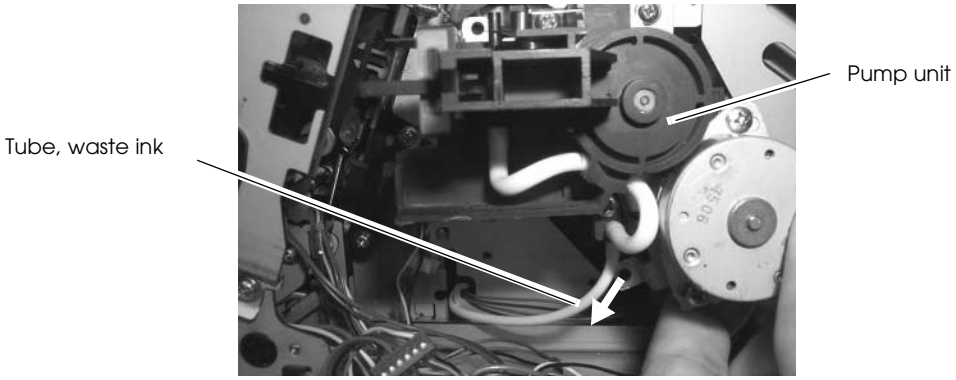


Figure 6-59 Removing the Tube, wast ink

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1) Move the head carriage to the left end position before you install the ***Pump unit****.*

2) Move the cleaning plate backward by lifting the head carriage lock lever up before you install the ***Pump unit****. This operation is necessary because the head nozzle can be damaged if the nozzle contacts the cleaning plate before the plate contains ink.*

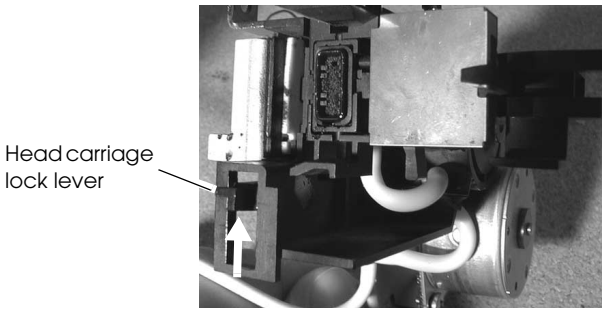


Figure 6-60 Head carriage lock lever

3) Insert the cables for the ***Pump unit*** *into the clamp shown below.*

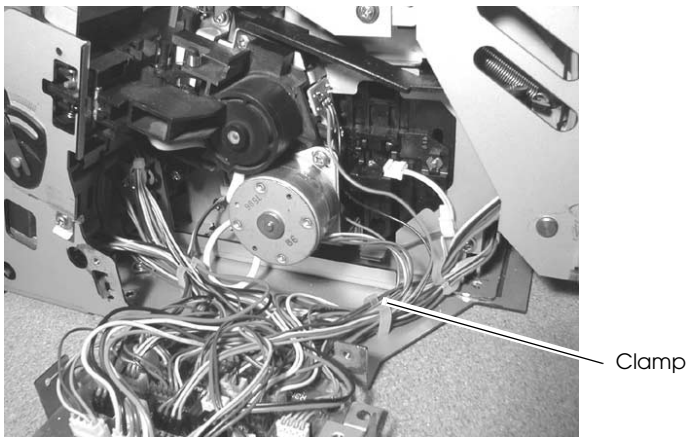


Figure 6-61 Clamp for the Pump unit cables

4) Make sure that no cables are caught.

Roll paper unit

Follow the steps below to disassemble the unit.

1. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the “Covers and upper case” section in this chapter.

2. Remove the connector box and remove the **Cover, connector board.** See the “Connector box” section in this chapter.

3. Remove the three screws (C.C.S-tite, 3 x 5) from the **Pump unit** and set the **Pump unit** down safely.

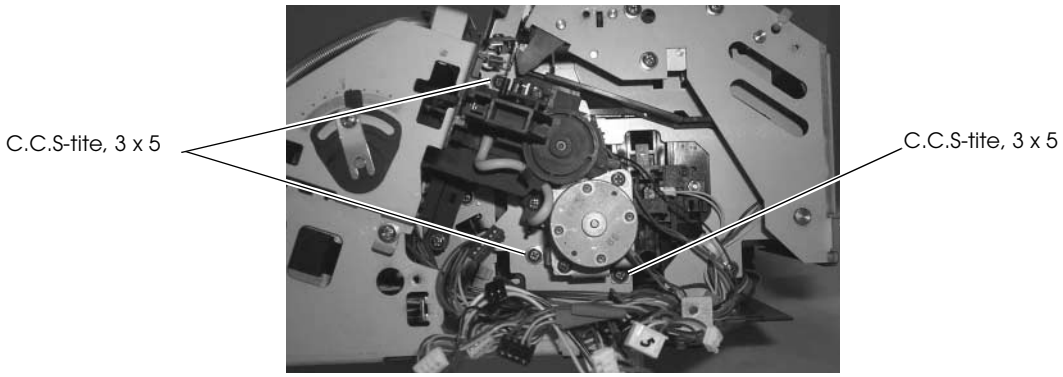


Figure 6-62 Removing the screws

4. Unhook all the cables from the two clamps shown below.

Figure 6-63 Unhooking the cables

5. Remove the two **Springs, platen hold** that are hooked between the **Roll paper unit** and **Platen paper guide sub-assembly**.

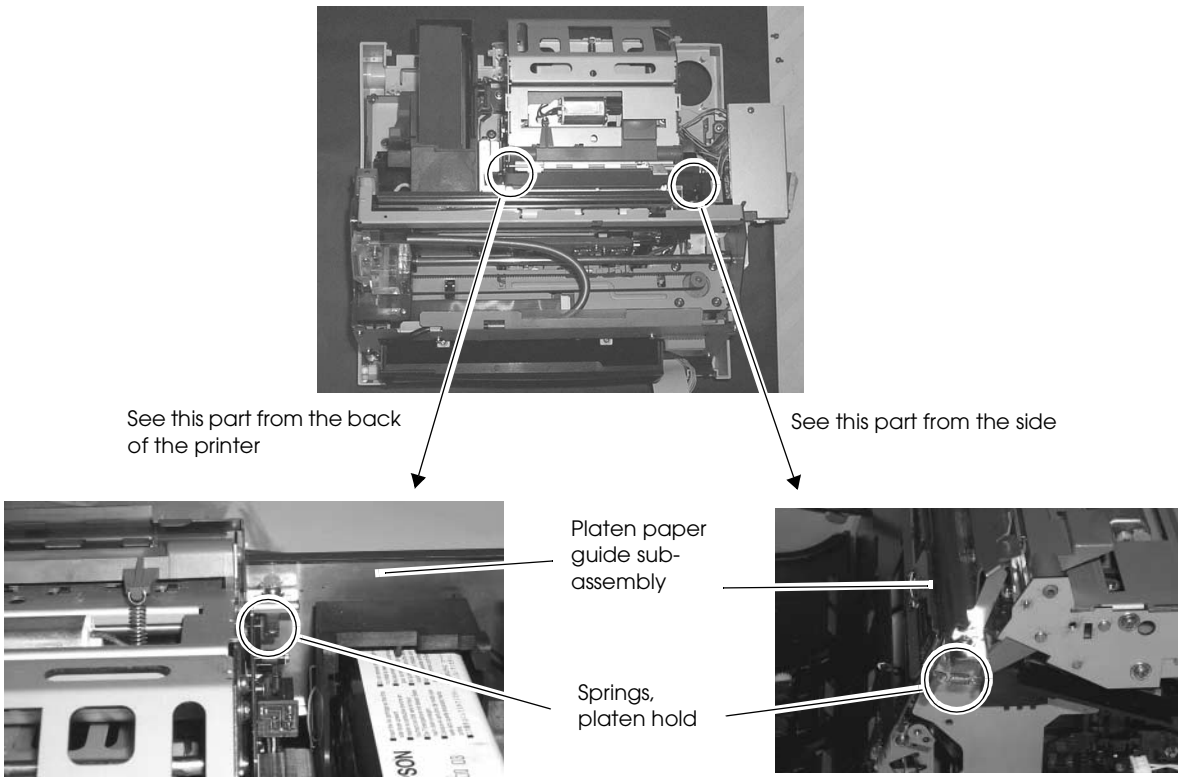


Figure 6-64 Removing the Springs, platen hold

6. Open the roll paper cover.

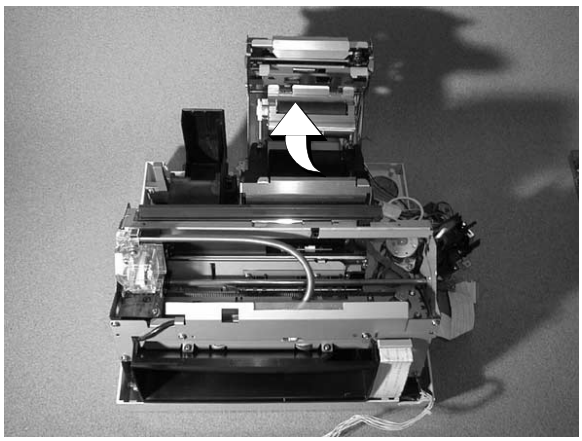


Figure 6-65 Opening the roll paper cover

7. Remove the four screws (C.C.S-tite, 3 x 5) from inside the **Roll paper unit**.

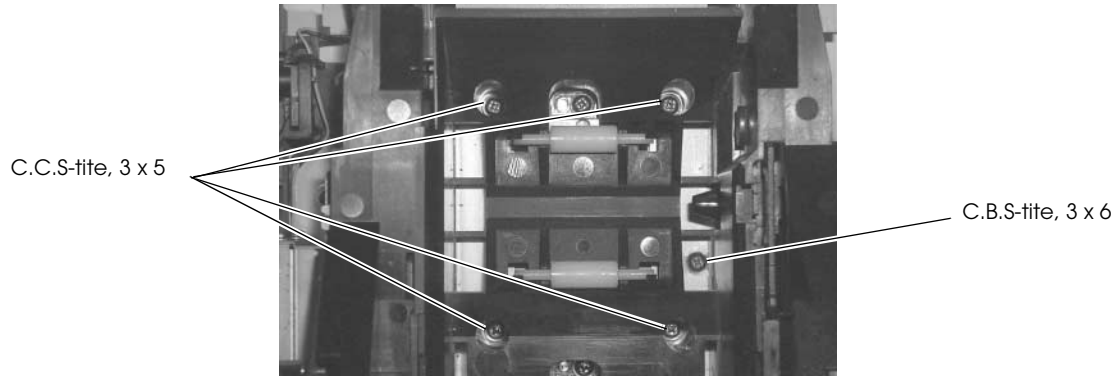


Figure 6-66 Removing the screws

8. Unhook the **Cartridge frame unit**'s cable from the three hooks on the **Roll paper unit**.

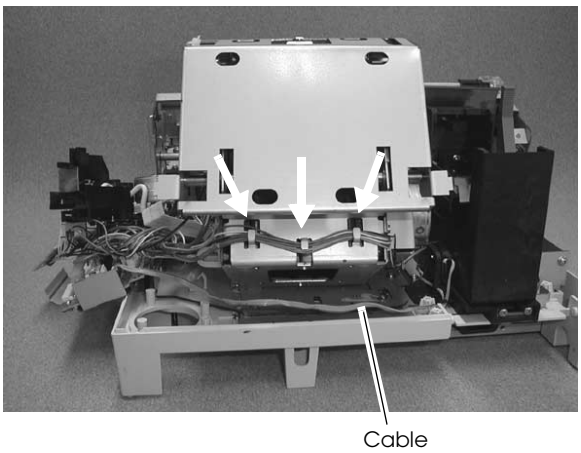


Figure 6-67 Unhooking the cable

9. Slide out the **Roll paper unit**, and disconnect the **Roll paper unit**'s cables from the **Connector board**.

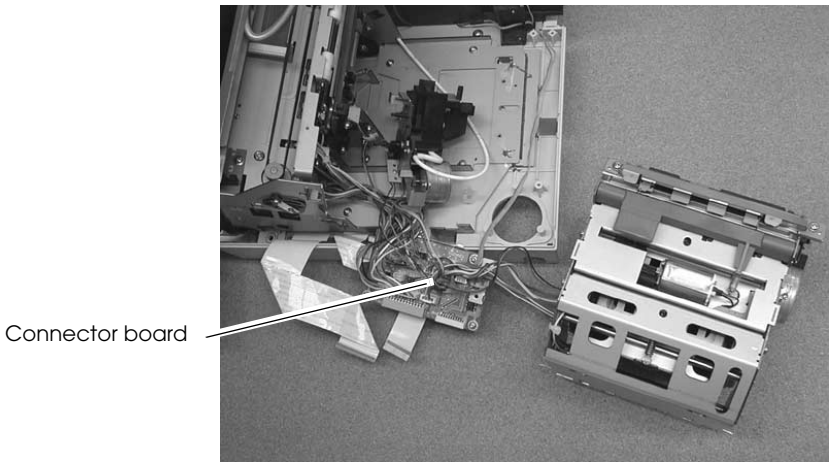


Figure 6-68 Disconnecting the cables

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *Before you install the* ***Roll paper unit****, make sure the* ***Tube, waste ink*** *is hooked into the two cut out portions of the frame.*

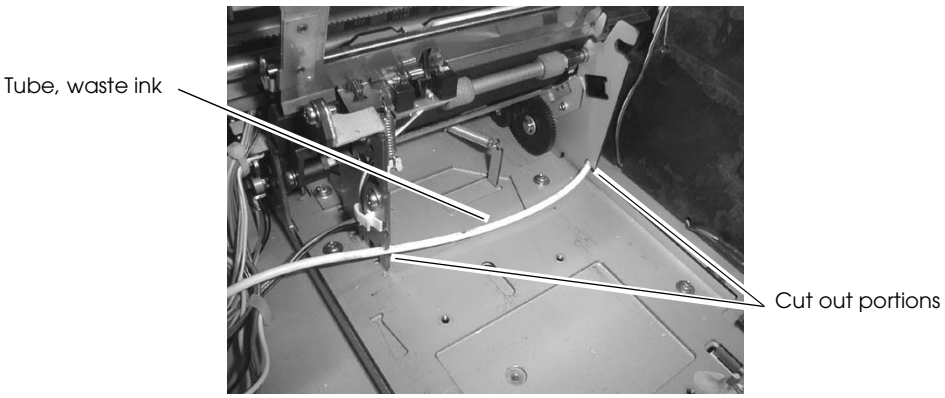


Figure 6-69 Hooking the Tube, waste ink

2. *When you set the **Roll paper unit** on the frame, make sure one shaft contacts the right side of the unit and the other shaft is completely attached to the cut out portion of the frame. During this process, do not push the **Roll paper unit** hard because the gears on the unit could be damaged.*

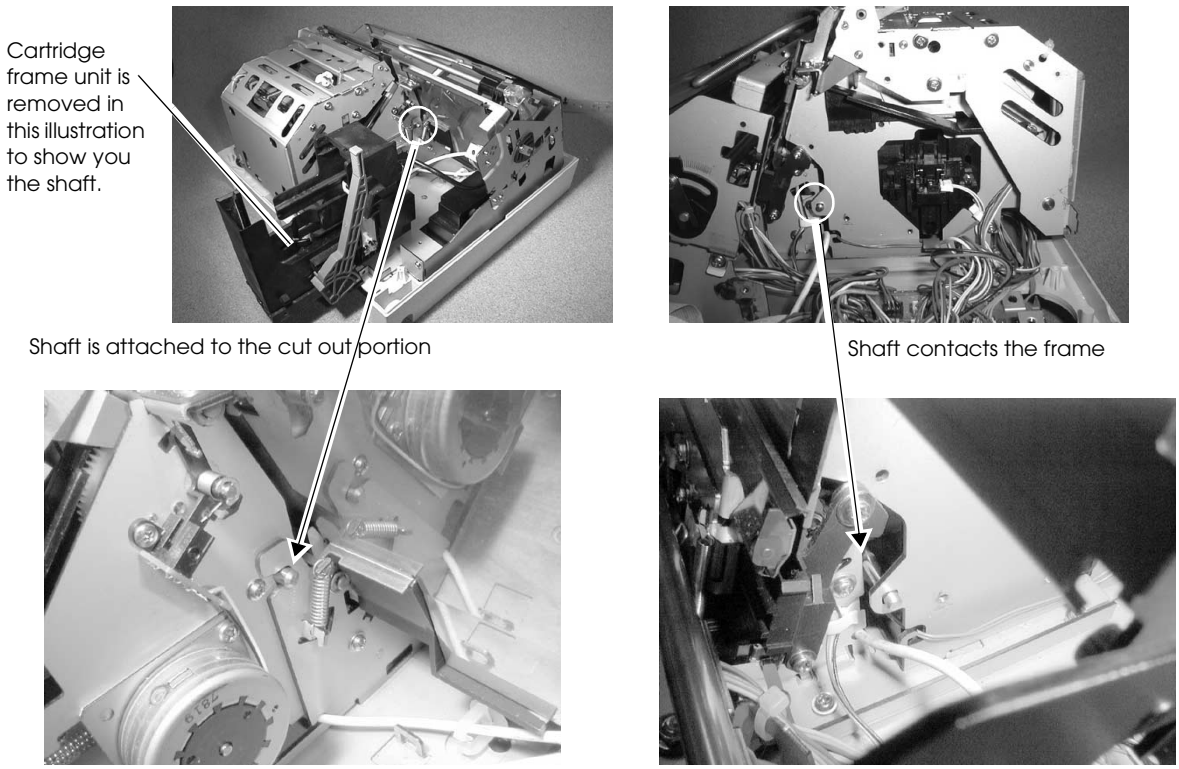


Figure 6-70 Contacting the shafts to the frame

3. *Before you secure the **Roll paper unit**, lubricate the five screws with O-10. This is important to protect the **Main circuit board unit** from the metallic particles from the screw hole.*

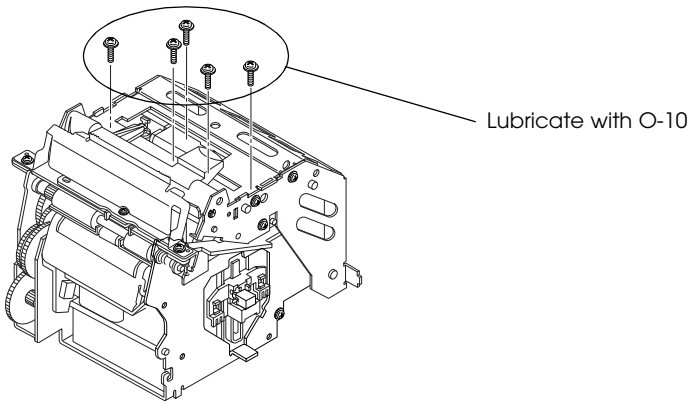


Figure 6-71 Lubricating the screws

4. *During installation, make sure no cables are caught.*

Head unit

⚠ *CAUTION:*

To maintain print quality, do not let any objects touch or contact the head nozzle.

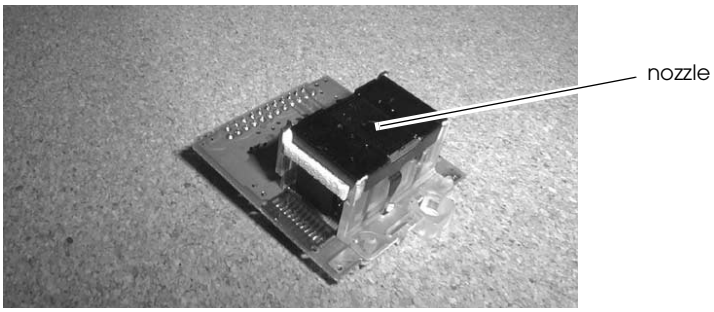


Figure 6-72 Head nozzle

Follow the steps below to disassemble the unit.

1. Perform the head exchange sequence using the TM-J8000 Service Utility. See the "Head exchange sequence" section in Chapter 5.

2. Remove the screw (C.B.P-tite, 3 x 12) from the **Damper sub-unit**. (After you have performed the head exchange sequence, the head carriage has been unlocked and moved to the left end.)

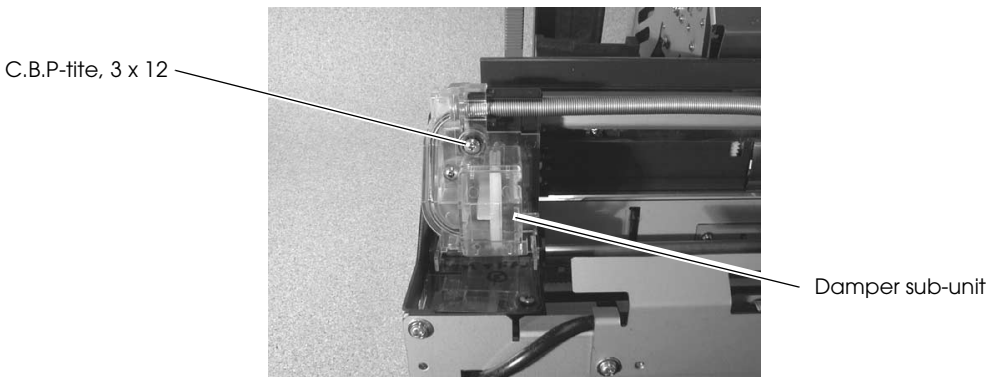


Figure 6-73 Removing the screw

3. While pressing the two tabs inward, pull the **Damper sub-unit** to remove it.

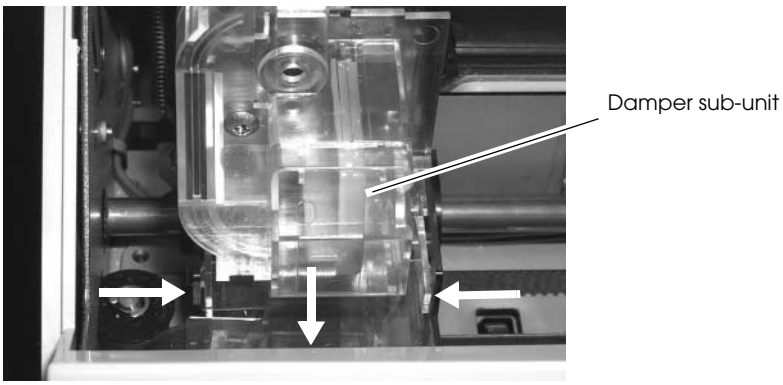


Figure 6-74 Removing the Damper sub-unit

4. Remove the screw (C.B.P-tite, 2.6 x 8); then remove the **Holding plate, FPC** by releasing the tabs from the head carriage.

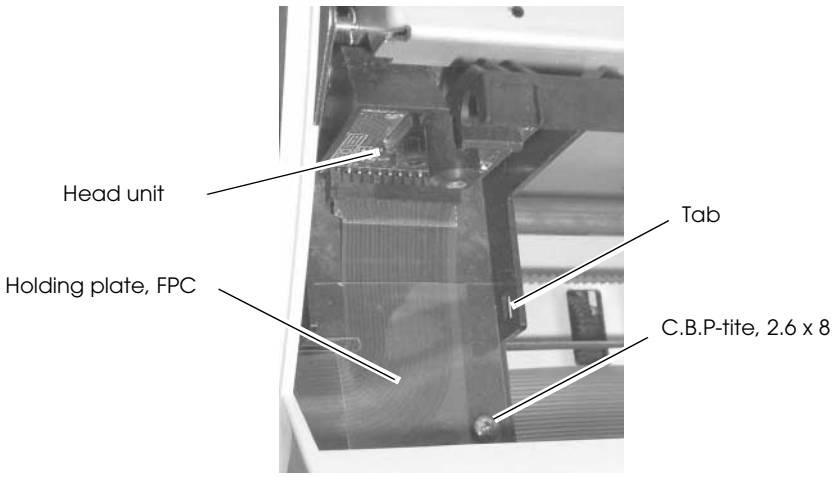


Figure 6-75 Removing the Holding plate, FPC

5. Remove the two screws (C.B.P-tite, 2.6 x 8) and remove the **Head unit**.

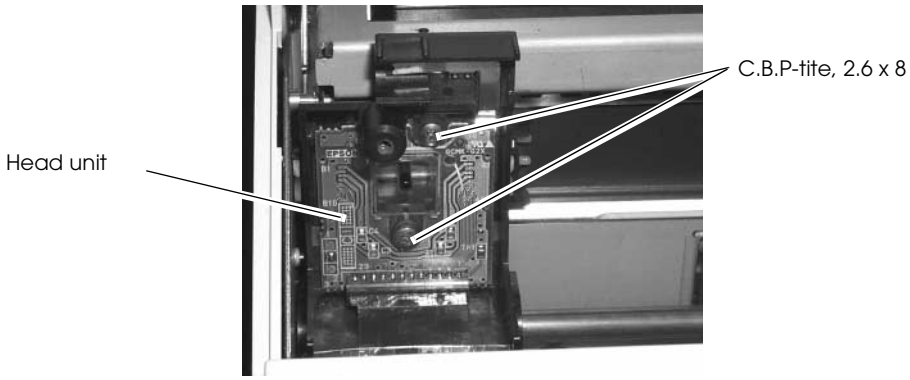


Figure 6-76 Removing the screws

6. Disconnect the **Fp circuit, head** from the **Head unit**.

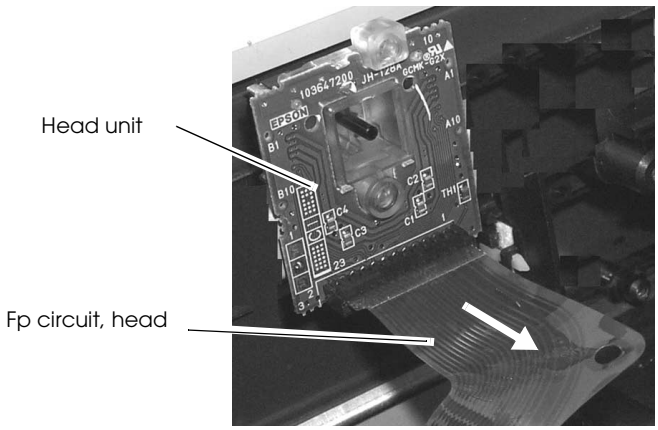


Figure 6-77 Disconnecting the Fp circuit, head

To install, reverse the removal procedure. Read the following note before installation.

Note for installation:
While installing the ***Damper sub-unit****, push it until you feel it click, and two tabs shown below are hooked correctly.*

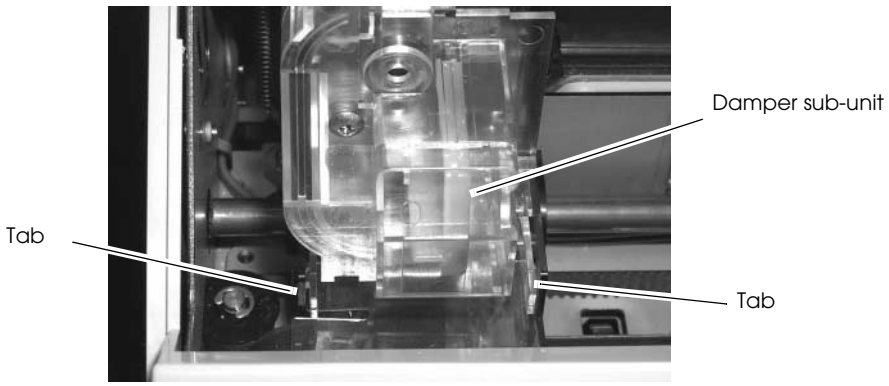


Figure 6-78 Installing the Damper sub-unit

Cartridge frame unit

Follow the steps below to disassemble the unit.

1. Discharge the ink from the TM-J8000 printer. See the “Ink discharging sequence” section in Chapter 5.

2. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the “Covers and upper case” section in this chapter.

3. Remove the connector box and disconnect the **Cartridge frame unit**’s cable. See the “Connector box” section in this chapter.

4. Unhook the **Cartridge frame unit**’s cable from the two clamps and three tabs.

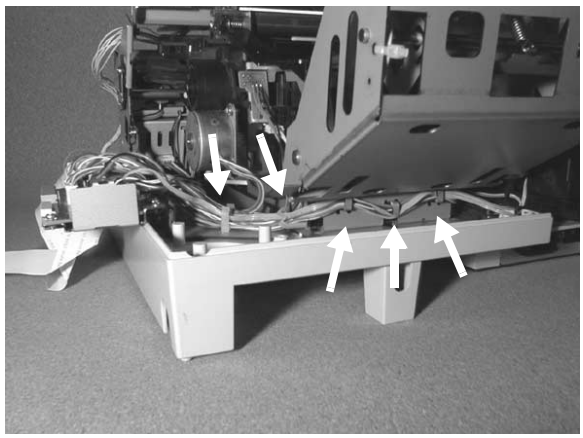


Figure 6-79 Unhooking the clamps and tabs

5. Pull back the ink cartridge lever and remove two C.C.S-tite, 3 x 6 screws and C.B.P-tite, 3 x 12 screw.

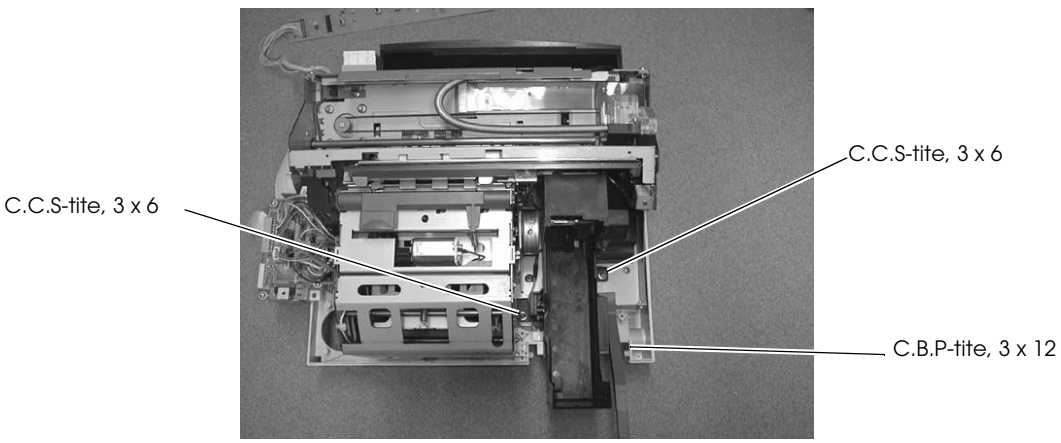


Figure 6-80 Removing the screws

6. Pull back the **Cartridge frame unit** until it stops, and lift it up; then put it on the frame as shown below.

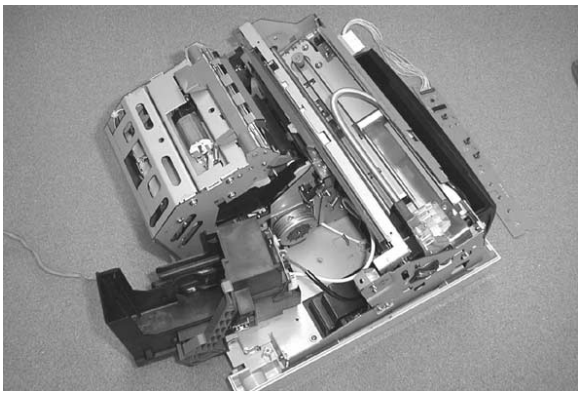


Figure 6-81 Removing the Cartridge frame unit

7. Wearing rubber fingertips, unfasten the **Joint, M6** and disconnect the **Damper sub-unit**'s tube from the **Cartridge frame unit**.

> ⚠ ***CAUTION:***
>
> *Wear rubber fingertips before you touch the tube. Contamination of the tip of the tube could cause ink leakage.*

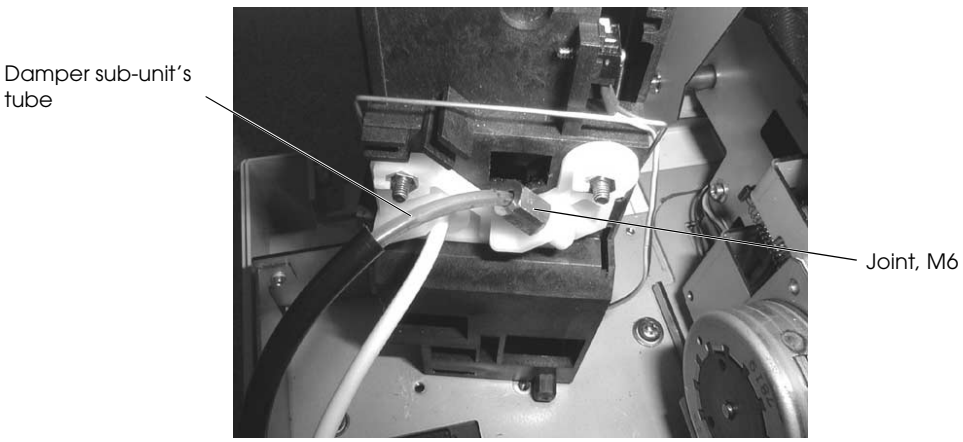


Figure 6-82 Disconnecting the Damper sub-unit's tube

8. Disconnect the **Tube, waste** from the **Cartridge frame unit**'s tube.

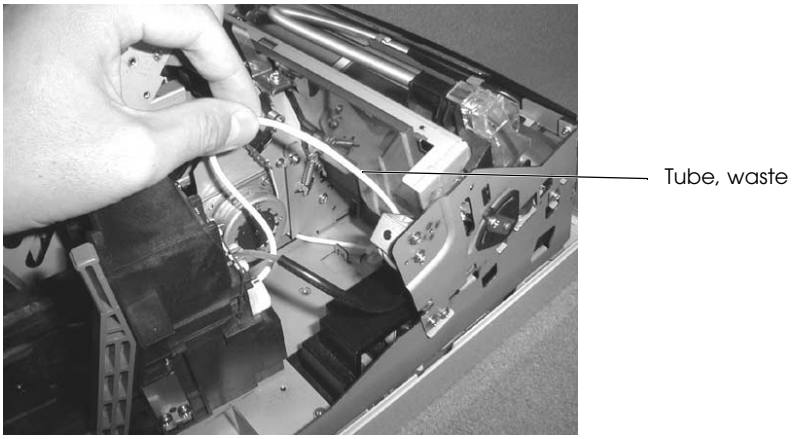


Figure 6-83 Disconnecting the Tube, waste

To install, follow the steps below.

1. Connect the **Tube, waste** and the **Cartridge frame unit**'s tube. Make sure there is no gap between the two tubes.

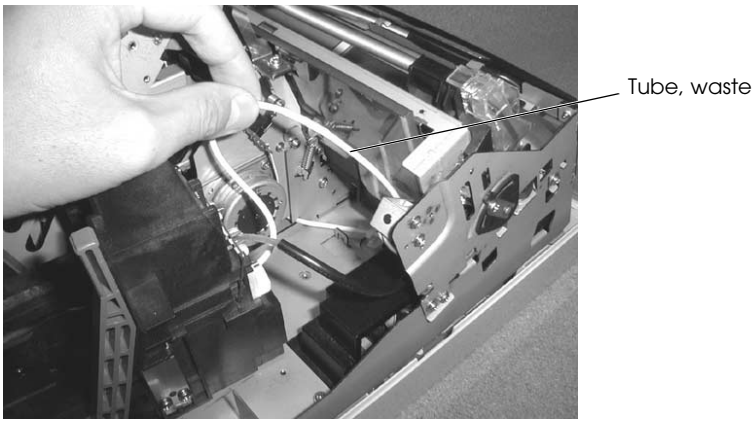


Figure 6-84 Connecting the Tube, waste

2. Wearing rubber fingertips, install the **Joint, M6** and **O ring, tube fastener** onto the **Damper sub-unit**'s tube. Adjust the position of the **O ring, tube fasten** as shown in the illustration.

> ⚠ ***CAUTION:***
>
> *Wear rubber fingertips before you touch the tube. Contamination of tip of the tube could cause ink leakage.*

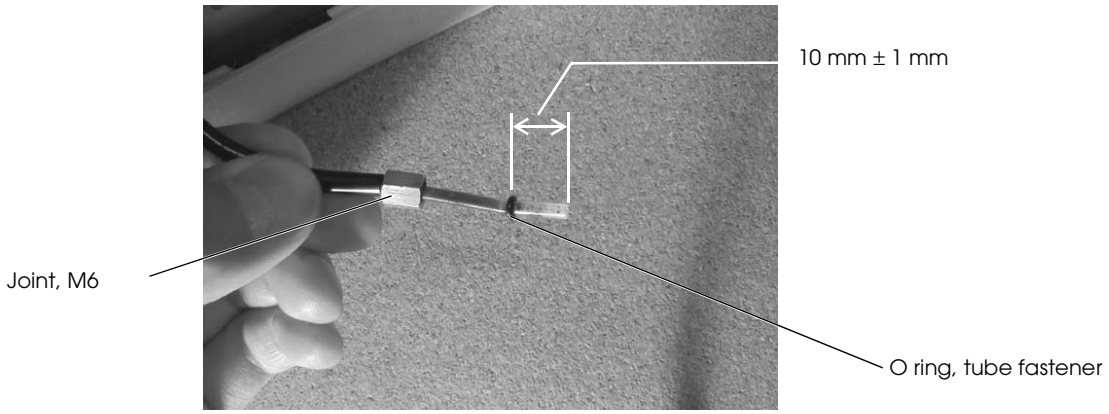


Figure 6-85 Setting the Joint, M6 and O ring, tube fasten

3. Connect the **Damper sub-unit**'s tube into the **Cartridge frame unit** until the tube stops at the **O ring, tube fastener**; then secure the **Joint, M6** with the torque-limiting wrench. (Tightening torque is 0.12 to 0.16 Nm or 1.2 to 1.6 kgcm.)

> ⚠ ***CAUTION:***
>
> *Tightening with any other tool may damage the tube and cause ink leaks. Low tightening torque may also cause ink leakage.*

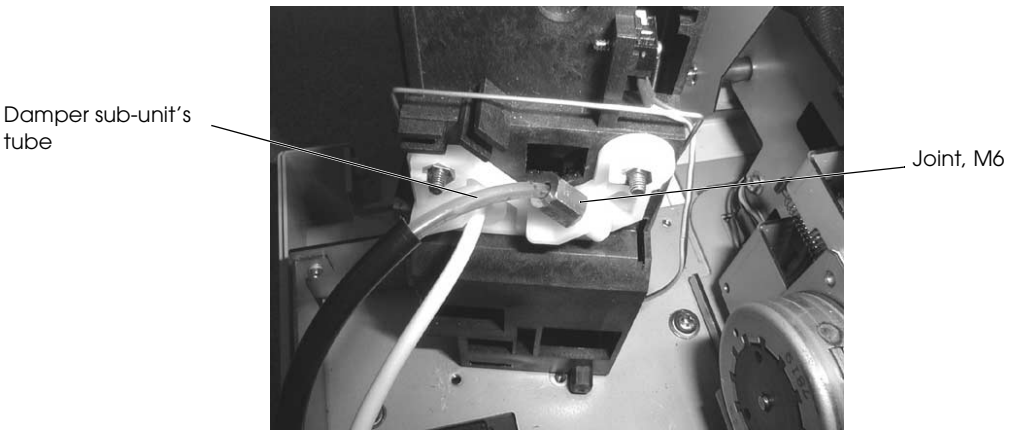


Figure 6-86 Connecting the Damper sub-unit's tube

4. Hook the **Tube, waste** with the clamp and bend it as shown below.

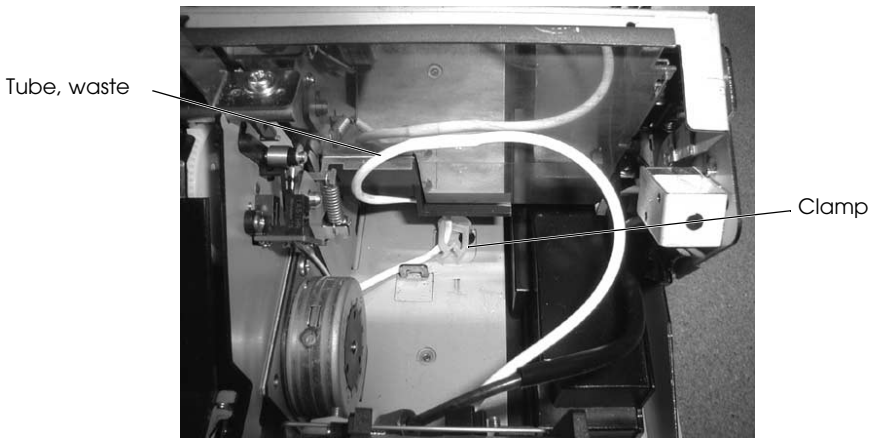


Figure 6-87 Hooking and forming the Tube, waste

5. Make sure the **Tube, waste** is behind the tab shown below.

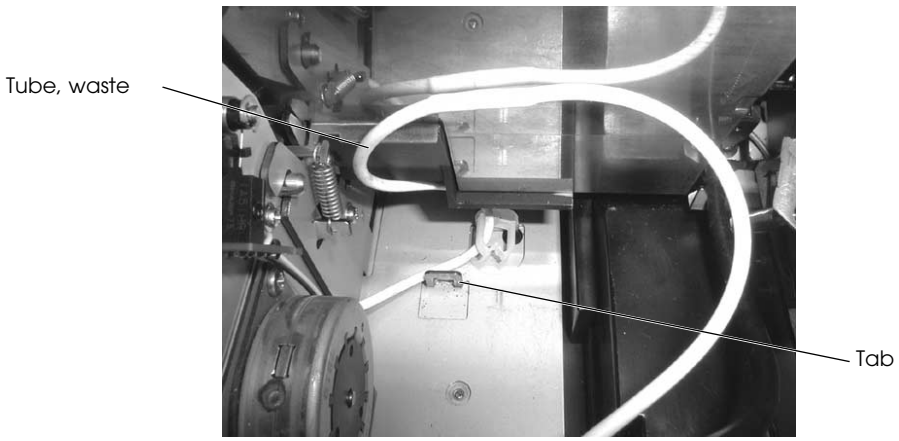


Figure 6-88 Inserting the Tube, waste behind the tab

6. Align the tab on the **Cartridge frame unit** into the hole on the tab shown below and install the **Cartridge frame unit**. Do no pinch any tube and cables while you install the unit.

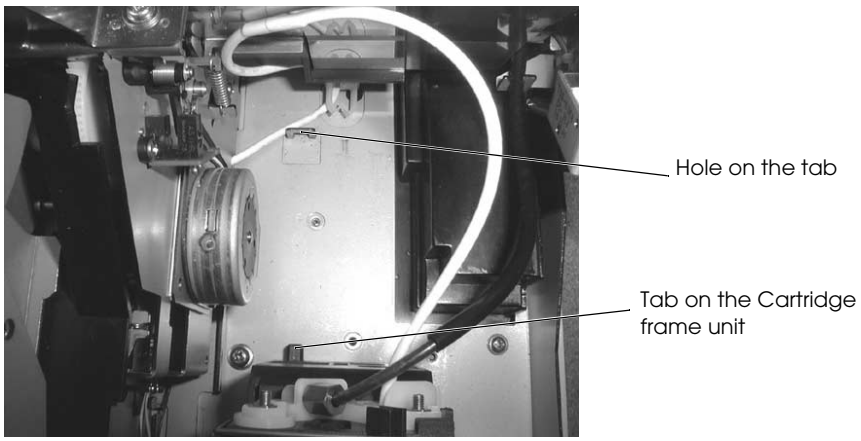


Figure 6-89 Setting the Cartridge frame unit

7. Lubricate the two screws (C.C.S-tite, 3 x 6) shown below with O-10 and secure them. This is important to protect the **Main circuit board unit** from the metallic particles from the screw hole.

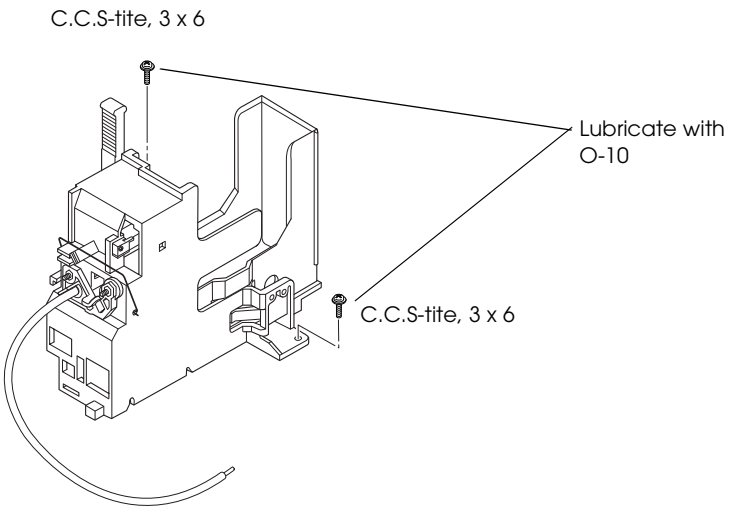


Figure 6-90 Lubricating the two screws

8. Secure the rest of the screw (C.B.P-tite, 3 x 12) to the side of the **Cartridge frame unit**.

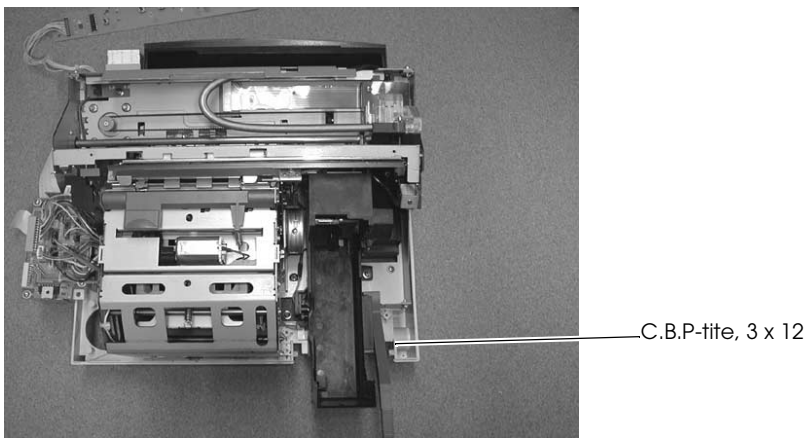


Figure 6-91 Securing the screw

9. Hook the **Cartridge frame unit**'s cable in the three tabs and two clamps.

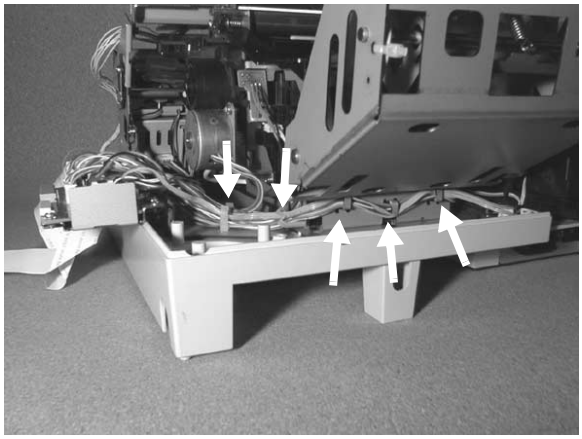


Figure 6-92 Hooking the cable

10. Connect the **Cartridge frame unit**'s cable to the **Connector board** and install the connector box. See the "Connector box" section in this chapter.

11. Install the covers. Reverse the "Covers and upper case" section in this chapter.

Carriage unit

⚠ *CAUTION:*

To maintain print quality, do not let any objects touch or contact the head nozzle.

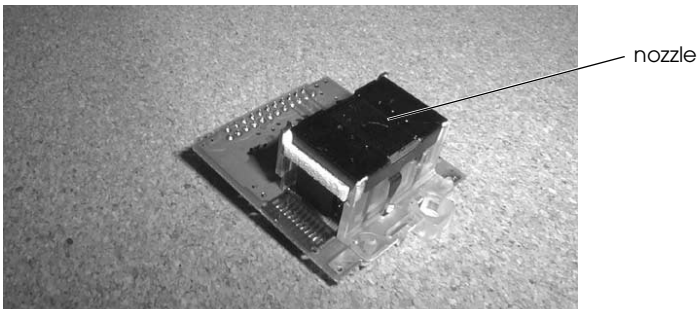


Figure 6-93 Head nozzle

⚠ *CAUTION:*

Do not touch the tip of the Damper sub-unit's tube. Contamination of tube tip could cause ink leakage.

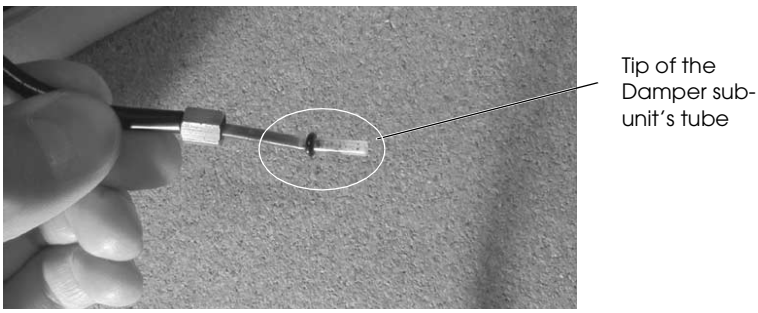


Figure 6-94 Tip of the Damper sub-unit's tube

Follow the steps below to disassemble the unit.

1. Perform the head exchange sequence using the TM-J8000 Service Utility. See the "Head exchange sequence" section in Chapter 5.

2. Remove the covers so you can ascess the **Mechanism assembly, M-J8000**. See the "Covers and upper case" section in this chapter.

3. Remove the connector box and remove the **Cover, connector board**. See the "Connector box" section in this chapter.

4. Unhook all the cables from the clamp shown below and disconnect the **Carriage unit**'s cable.

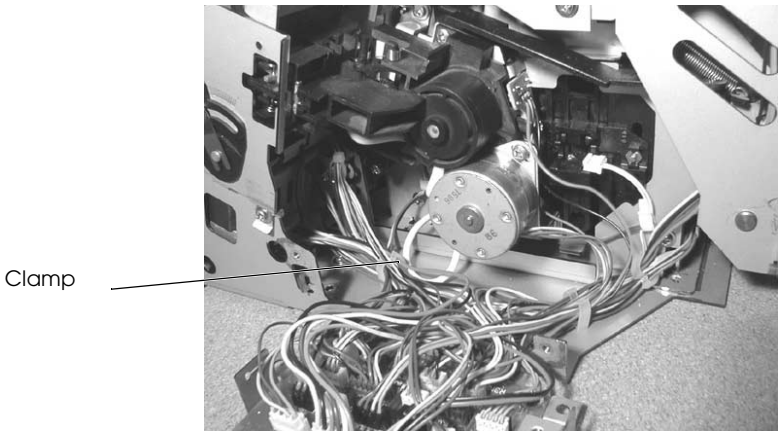


Figure 6-95 Unhooking the cables

5. Disconnect the **FFC, head**.

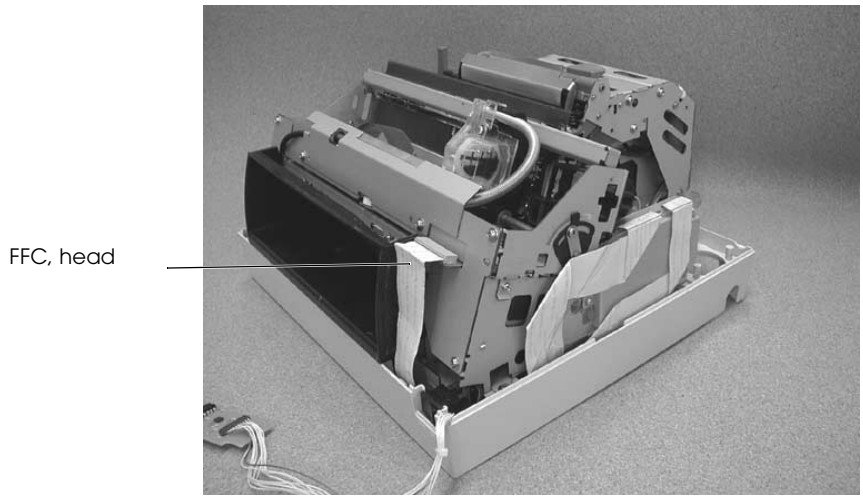


Figure 6-96 Disconnecting the FFC, head

6. Disconnect the **Damper sub-unit**'s tube from the **Cartridge frame unit**. See "Cartridge frame unit" section in this chapter.

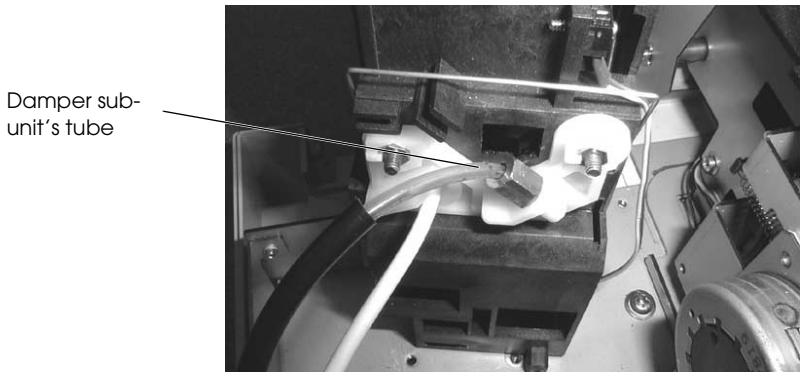


Figure 6-97 Disconnecting the Damper sub-unit's tube

7. Remove the seven screws and lift up the **Carriage unit**.

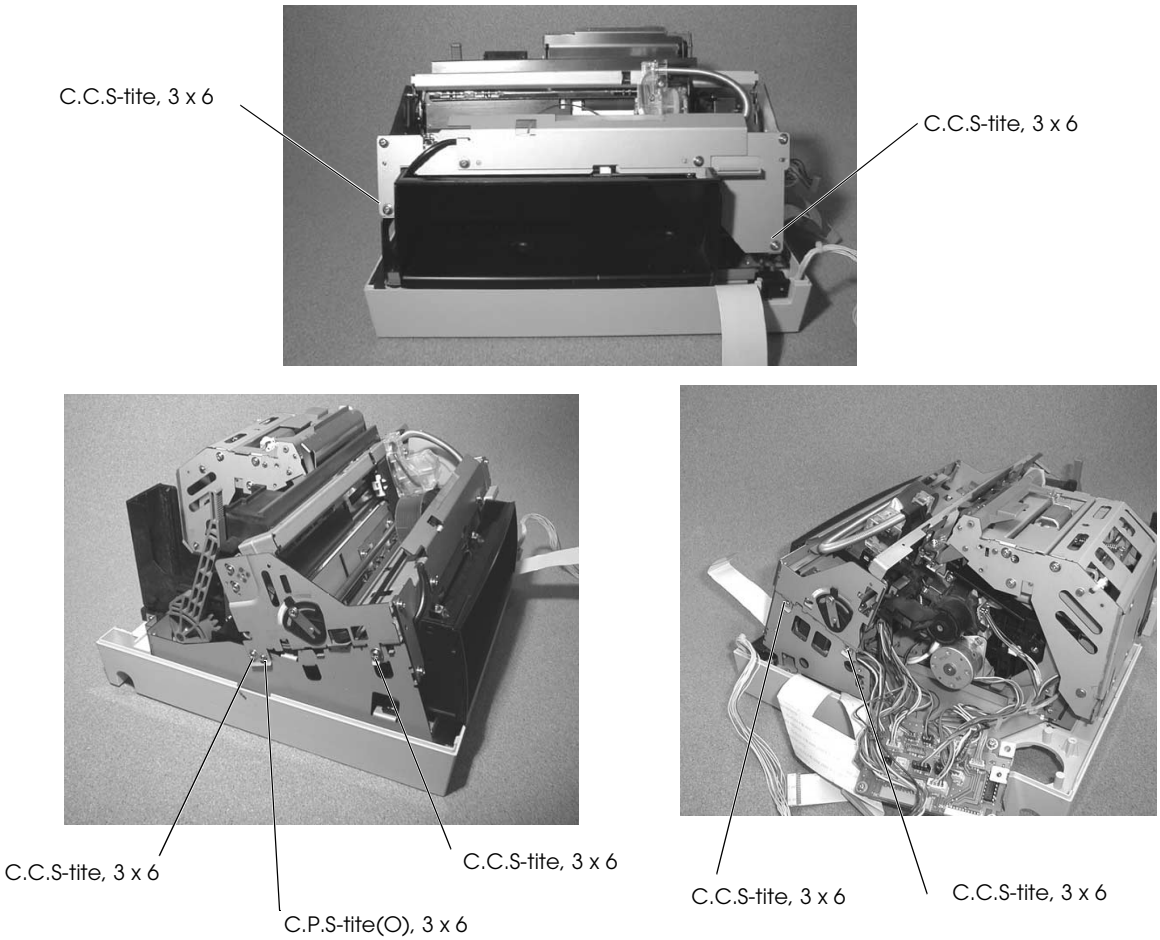


Figure 6-98 Removing the seven screws

8. Remove the following parts in order from the **Carriage unit**.

   (1) **Tube guide assist frame sub-assembly**
   (2) **Damper sub-unit**
   (3) **Holding plate, FPC**
   (4) **Fp circuit, head**
   (5) **Head unit**
   (6) **Spring, slip hold, top**

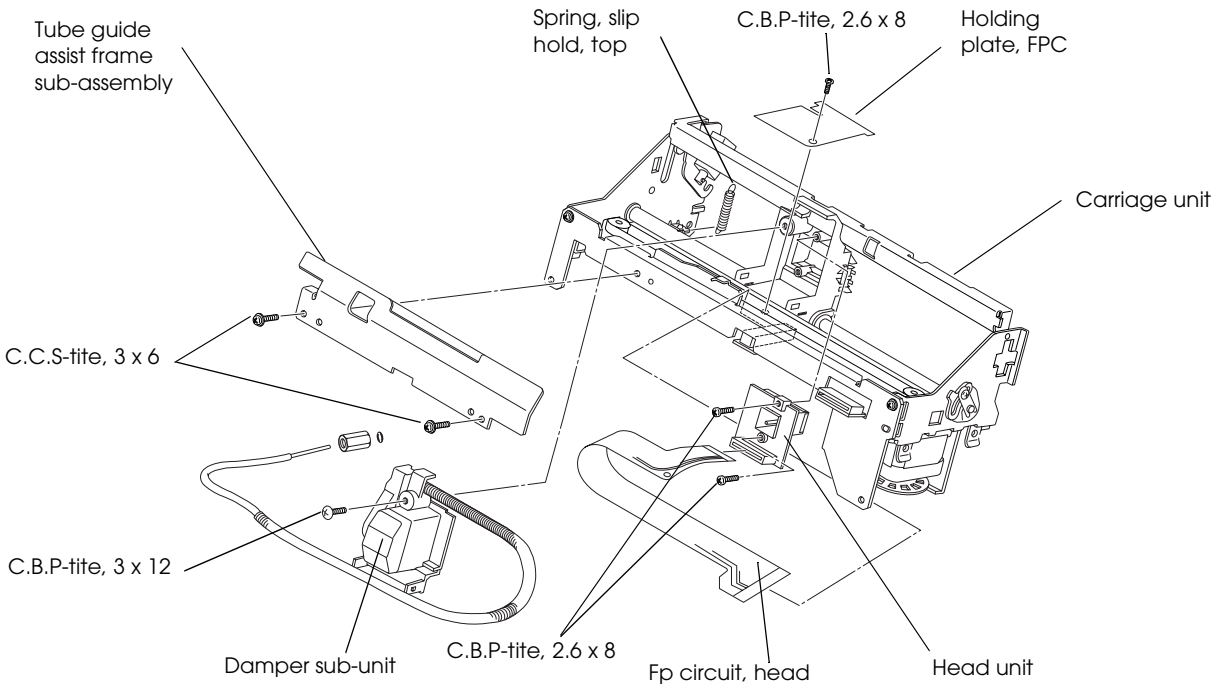


Figure 6-99 Removing the parts from the Carriage unit

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *When you install the **Fp circuit, head** to the **Carriage unit**, pull out the connector lock first. Then connect the **Fp circuit, head** into the connector and push back the connector lock to secure the **Fp circuit, head**.*

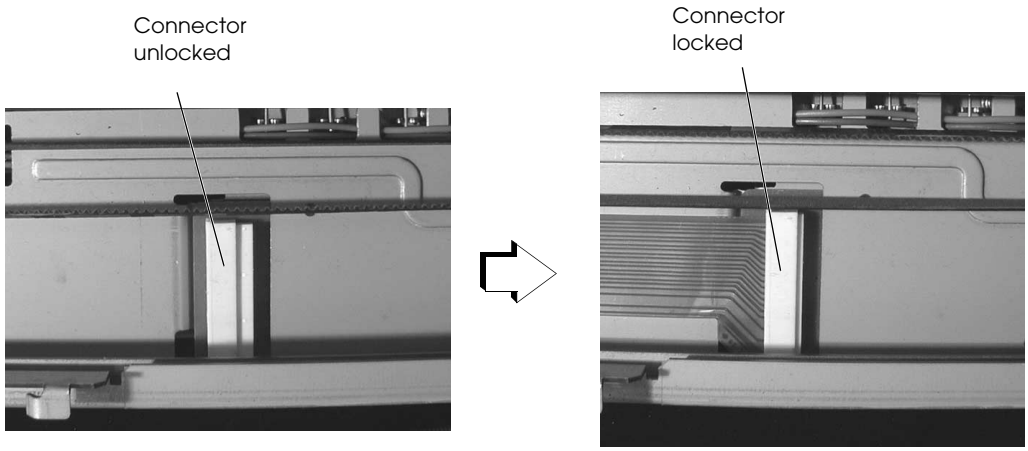


Figure 6-100 Connecting the Fp circuit, head

2. *When you install the **Damper sub-unit**, hook the **Damper sub-unit**'s spring-tube to the tab on the **Carriage unit** as shown below.*

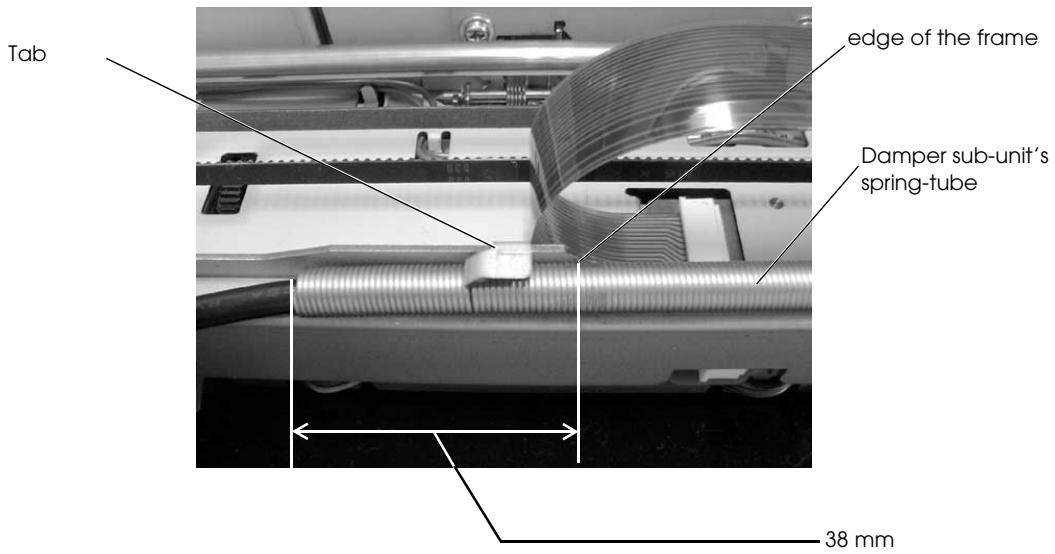


Figure 6-101 Hooking the spring-tube

3. *When you install the **Damper sub-unit**, hook the **Damper sub-unit**'s tube on the L-shaped tab and the cut out portion on the **Carriage frame unit** as shown below.*

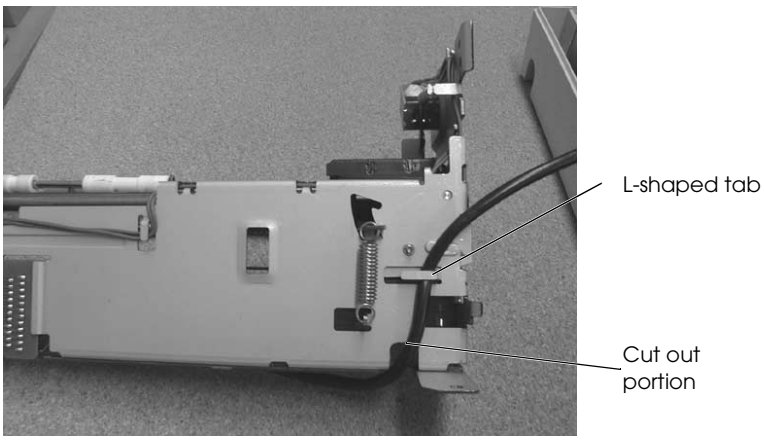


Figure 6-102 Hooking the Damper sub-unit's tube

4. *When you install the Carriage unit, hook the tube into the cut out portion on the frame.*

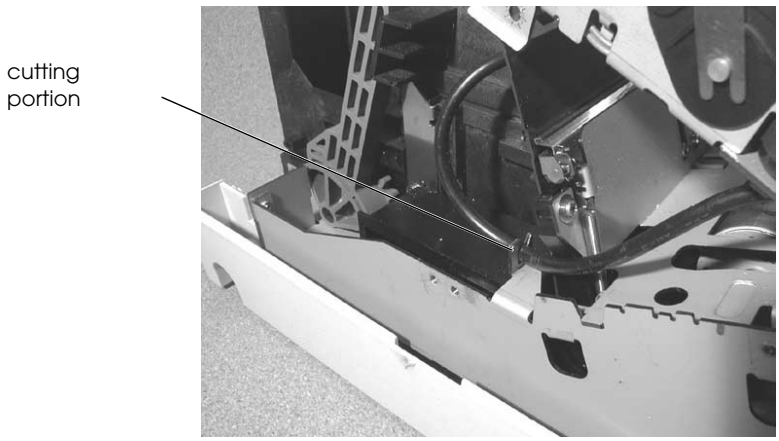


Figure 6-103 Hooking the Damper sub-unit's tube

5. *While installing the **Carriage unit**, make sure that no cables or **Damper sub-unit**'s tube are caught.*

Shutter unit

⚠ CAUTION:

To maintain print quality, do not let any objects touch or contact the head nozzle.

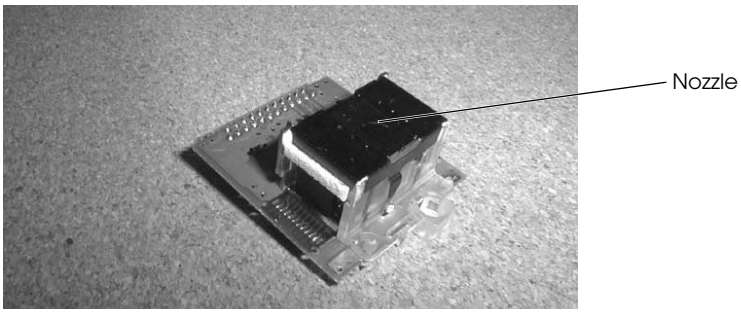


Figure 6-104 Head nozzle

⚠ CAUTION:

To maintain print quality, do not let any objects touch or contact the cap and cleaning plate on the Pump unit.

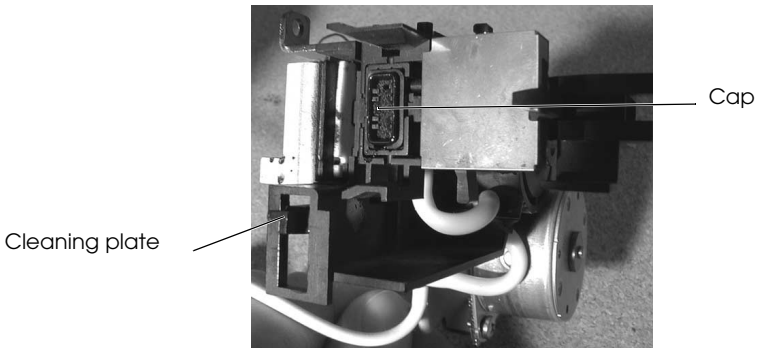


Figure 6-105 Cap and cleaning plate on the Pump unit

Follow the steps below to disassemble the unit.

1. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the "Covers and upper case" section in this chapter.

2. Remove the **Carriage unit** and put it aside. (It is not necessary to remove the tube from the **Cartridge frame unit**.) See the "Carriage unit" section in this chapter.

3. Remove the **Pump unit** and put it aside. (It is not necessary to remove the **Tube, waste** from the **Pump unit**.) See the "Pump unit" section in this chapter.

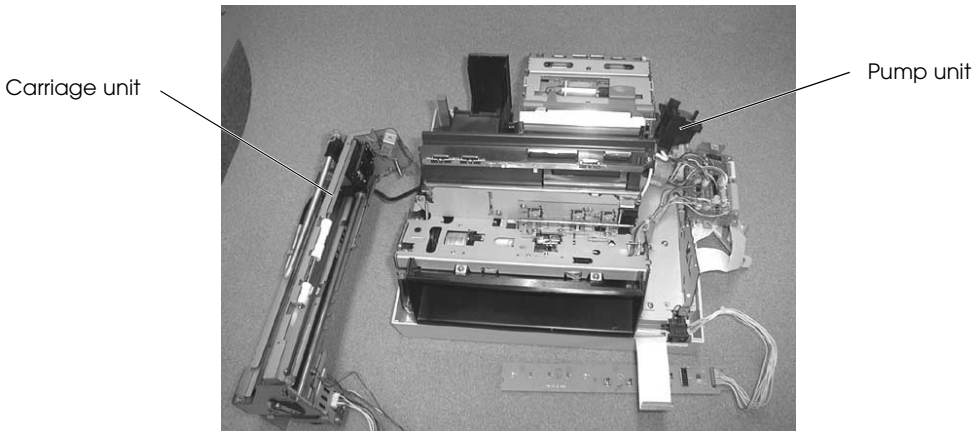


Figure 6-106 Removing the Carriage unit and Pump unit

4. Unhook all the cables from the clamp shown below and disconnect the **Shutter unit**'s cable.

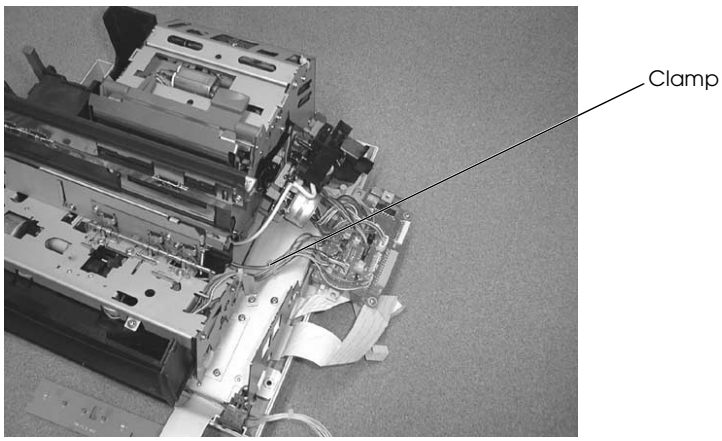


Figure 6-107 Unhooking the cables

5. Remove three screws (C.C.S-tite, 3 x 6) and remove an assembly (center roller fixing plate sub-assembly) from the **Shutter unit**.

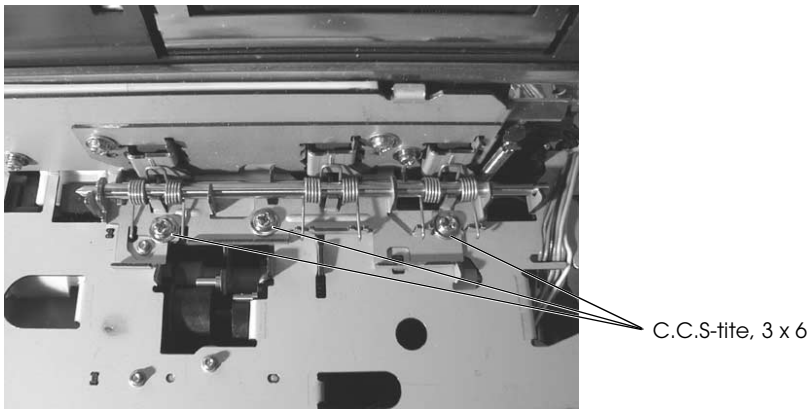


Figure 6-108 Removing the center roller fixing plate sub-assembly

Note:
*During installation of the **Shutter unit**, the above assembly (center roller fixing plate sub-assembly) must be assembled after you secured the **Shutter unit**.*

6. Remove the two screws and remove the **Dummy, MICR**.

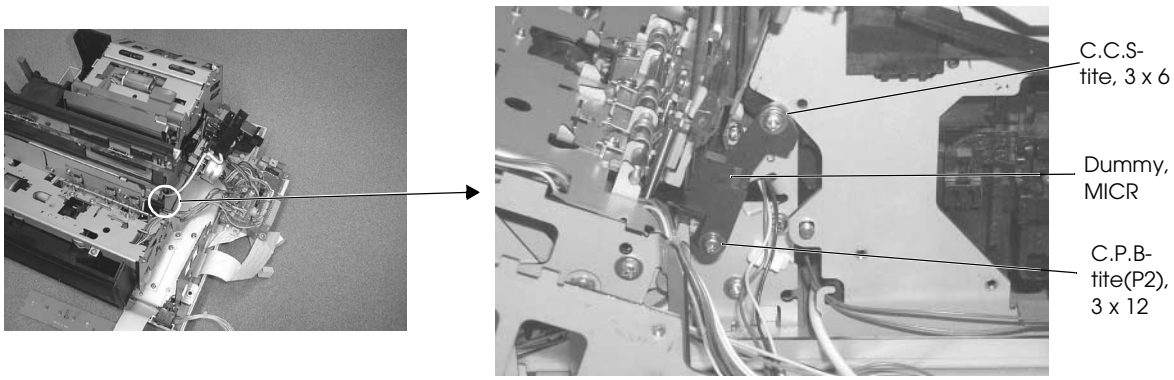


Figure 6-109 Removing the Dummy, MICR

7. Remove five screws; then lift up the **Shutter unit** while releasing the two tabs on the unit.

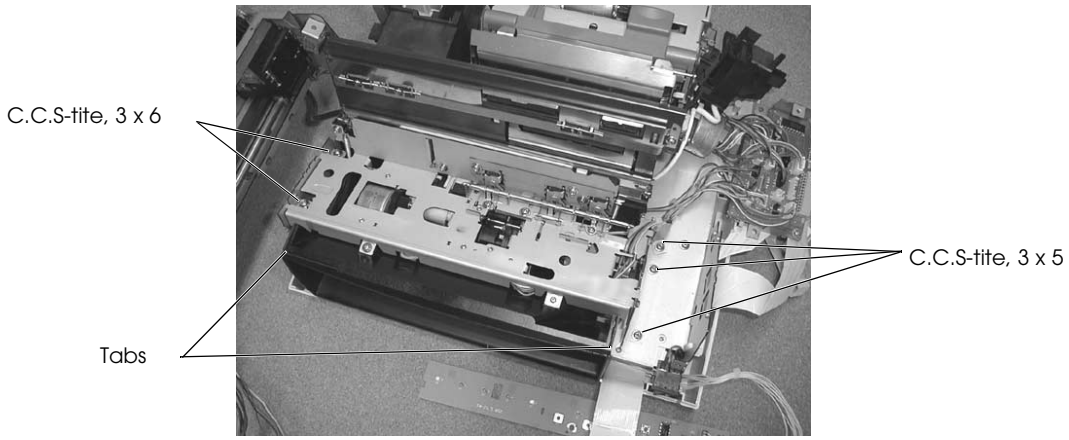


Figure 6-110 Removing five screws

To install, reverse the removal procedure. Read the following notes before installation.

Notes for installation:

1. *When you install the **Shutter unit**, make sure that no cables are caught.*

2. *Before you secure the right side of the **Shutter unit**, lubricate the three screws with O-10. This is important to protect the **Main circuit board unit** from the metallic swarf from the screw hole.*

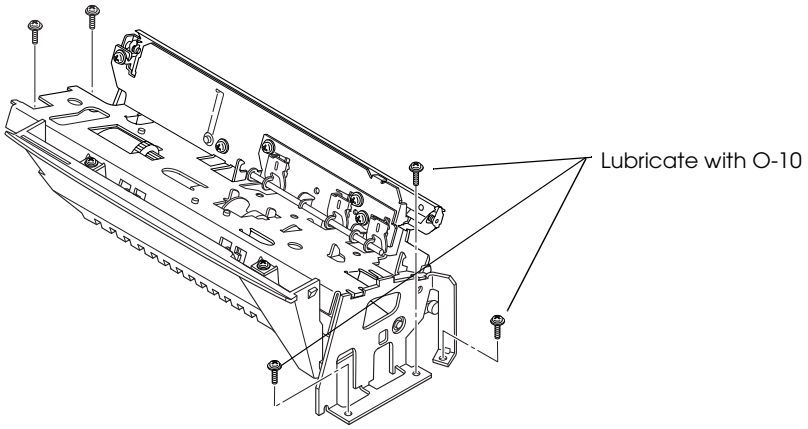


Figure 6-111 Lubricating the screws

3. *When you secure the right side of the **Shutter unit**, push the unit to contact the shutter frame to the base frame, as shown below.*

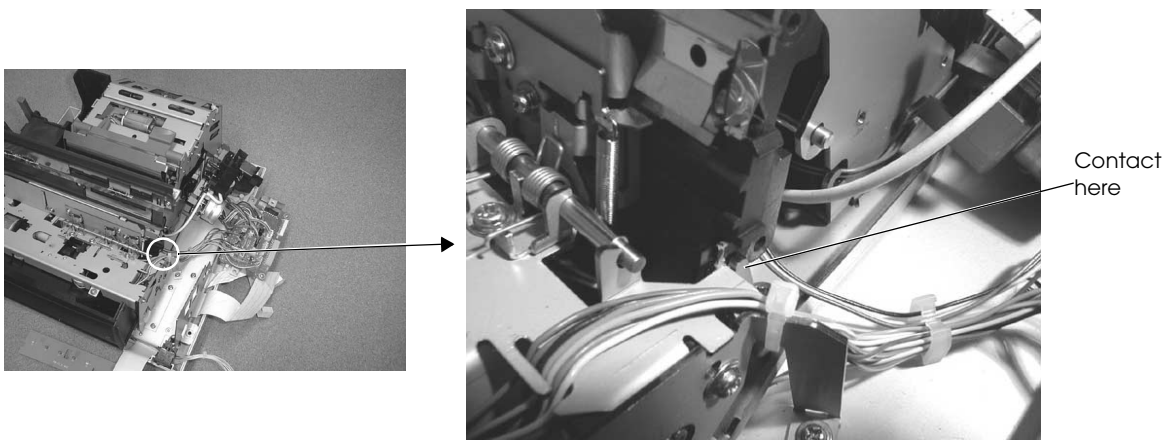


Figure 6-112 Attaching the two frames

Paper guide, slip, lower

⚠ CAUTION:

To maintain print quality, do not let any objects touch or contact the head nozzle.

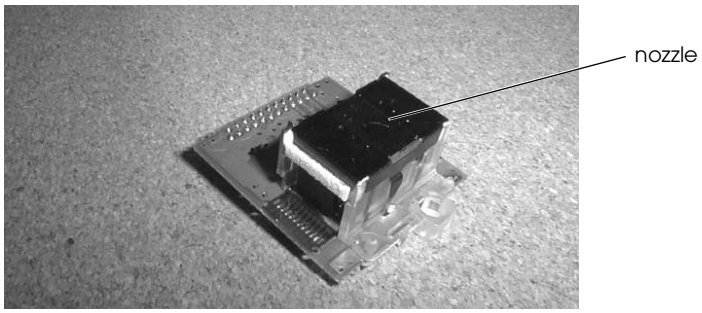


Figure 6-113 Head nozzle

⚠ CAUTION:

Do not touch the tip of the Damper sub-unit's tube. Contamination of tube tip could cause ink leakage.

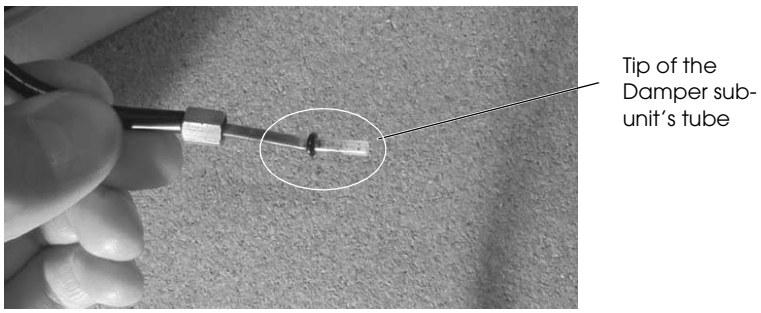


Figure 6-114 Tip of the Damper sub-unit's tube

Follow the steps below to disassemble the unit.

1. Perform the head exchange sequence using the TM-J8000 Service Utility. See the "Head exchange sequence" section in Chapter 5.

2. Remove the covers so you can access the **Mechanism assembly, M-J8000**. See the "Covers and upper case" section in this chapter.

3. Remove the connector box and remove the **Cover, connector board**. See the "Connector box" section in this chapter.

4. Remove the following units. See the relevant section in this chapter.

   - **Pump unit**
   - **Roll paper unit**
   - **Cartridge frame unit**
   - **Carriage unit**
   - **Shutter unit**

5. Remove the two **Springs, platen hold**.

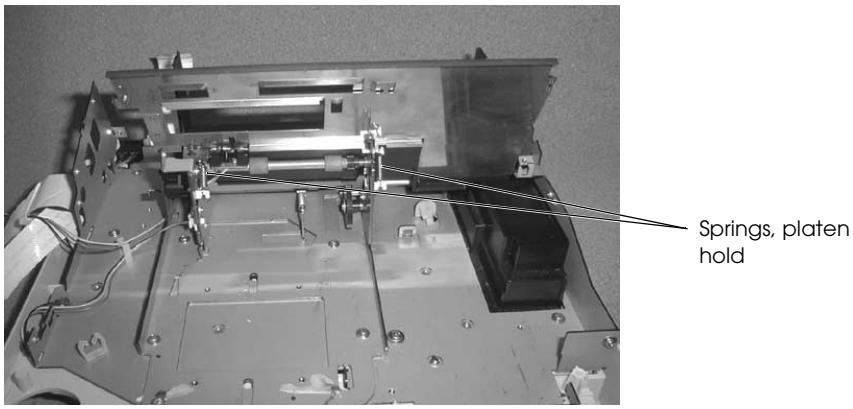


Figure 6-115 Removing the Springs, platen hold

6. Lift up the **Platen paper guide sub-assembly**.

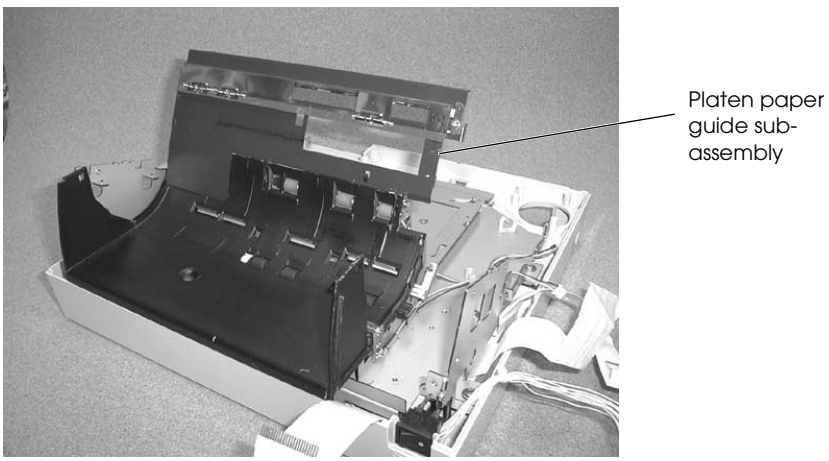


Figure 6-116 Removing the Platen paper guide sub-assembly

7. Remove the screw (C.P.T-B, 2.5 x 10) and plain washer (2.6 x 0.5 x 5).

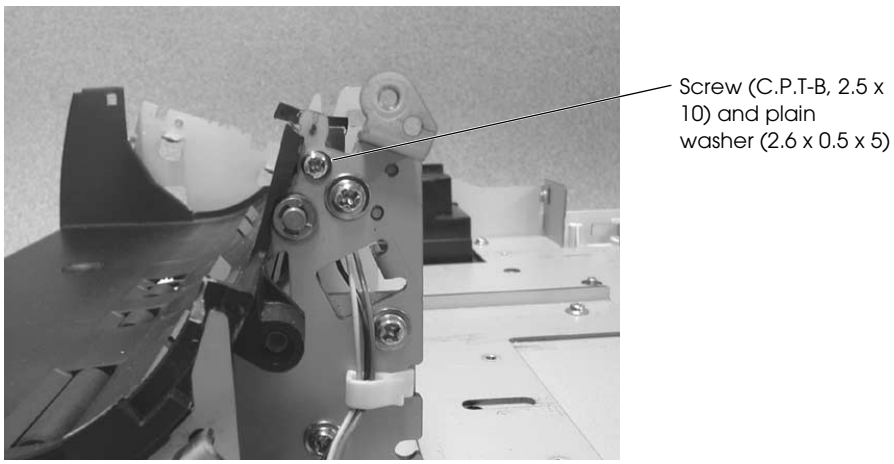


Figure 6-117 Removing the screw and washer

8. Remove the three screws (C.C.S-tite, 3 x 6) and the two **Sleeves, S. paper guide**; then lift up the **Paper guide, slip, lower**.

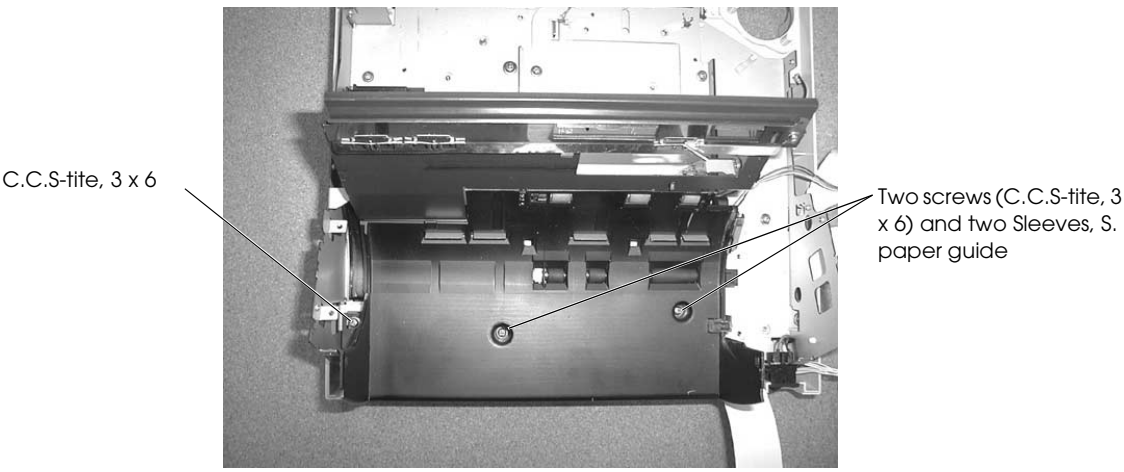


Figure 6-118 Removing the Paper guide, slip, lower

9. Remove the following parts from the **Paper guide, slip, lower**.

   - **B.O.F. detector sub-assembly**
   - **Slip detector sub-assembly**
   - **Shaft, slip detect lever/Spring, slip detect lever/Lever, slip detect**

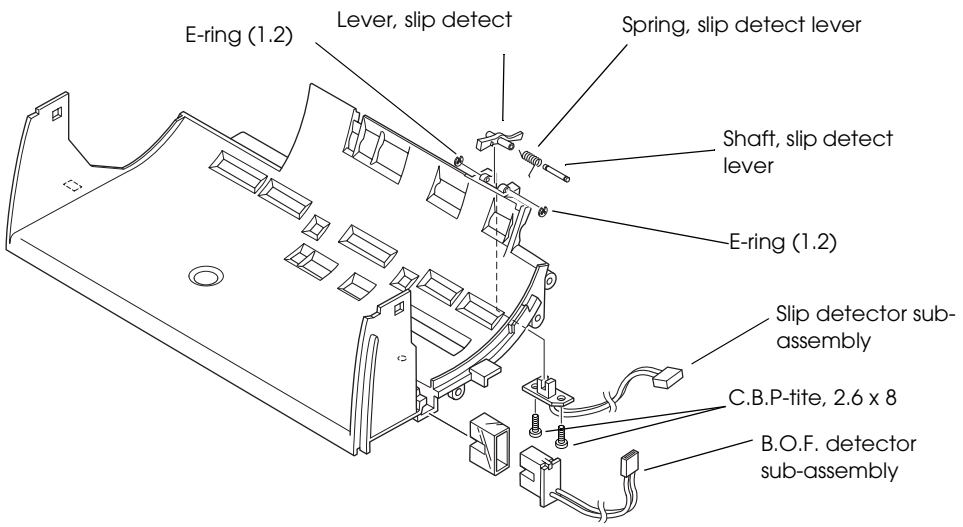


Figure 6-119 Removing the parts from the Paper guide, slip, lower

To install, follow the steps below.

1. Assemble the following parts on the **Paper guide, slip, lower**.

   - **B.O.F. detector sub-assembly**
   - **Slip detector sub-assembly**
   - **Shaft, slip detect lever/Spring, slip detect lever/Lever, slip detect**

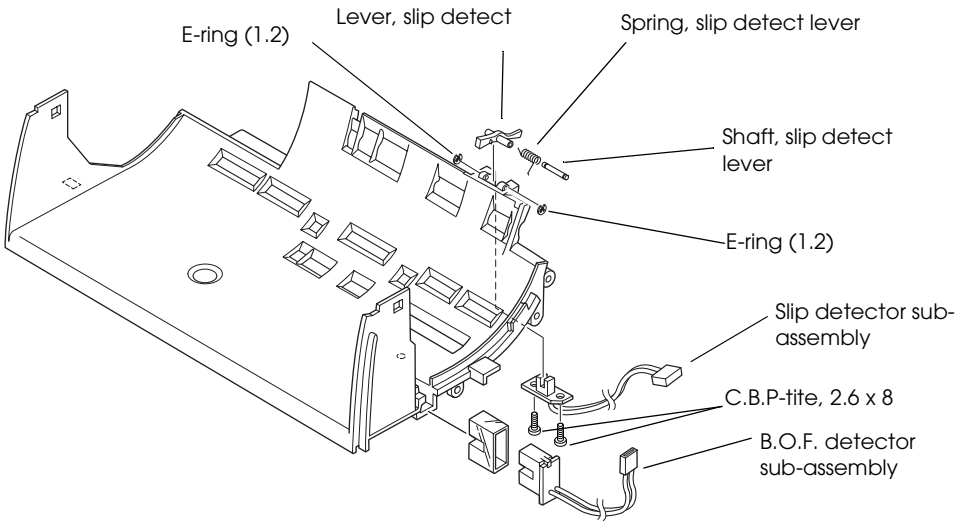


Figure 6-120 Installing the parts on the Paper guide, slip, lower

2. Install the **Spring, S. paper guide** on the frame.

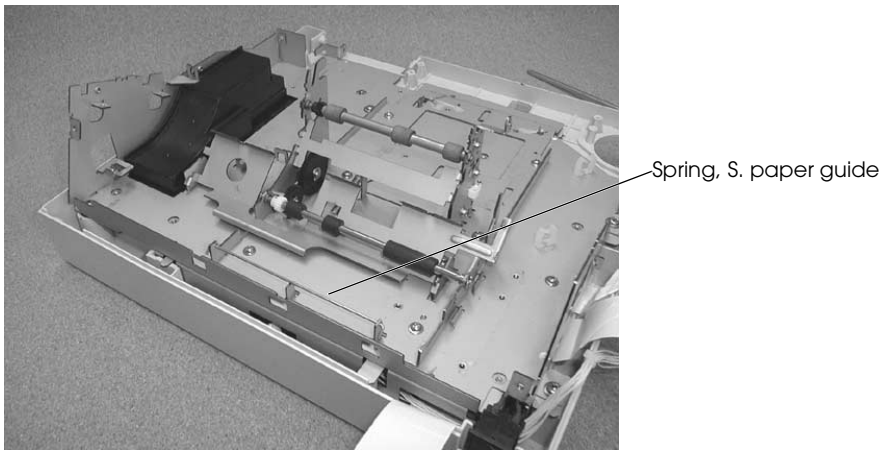


Figure 6-121 Setting the Spring, S. paper guide

3. Install the **Paper guide, slip, lower** on the frame. Make sure no cables are caught.

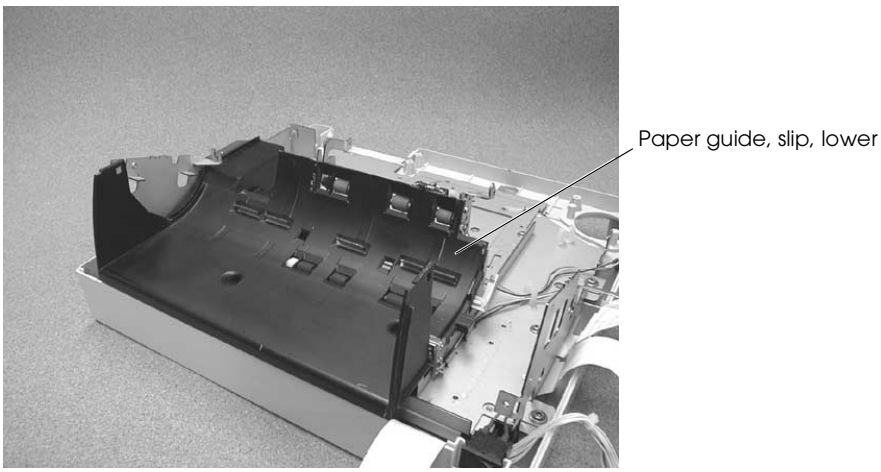


Figure 6-122 Installing the Paper guide, slip, lower

4. Arrange the two cables as shown below.

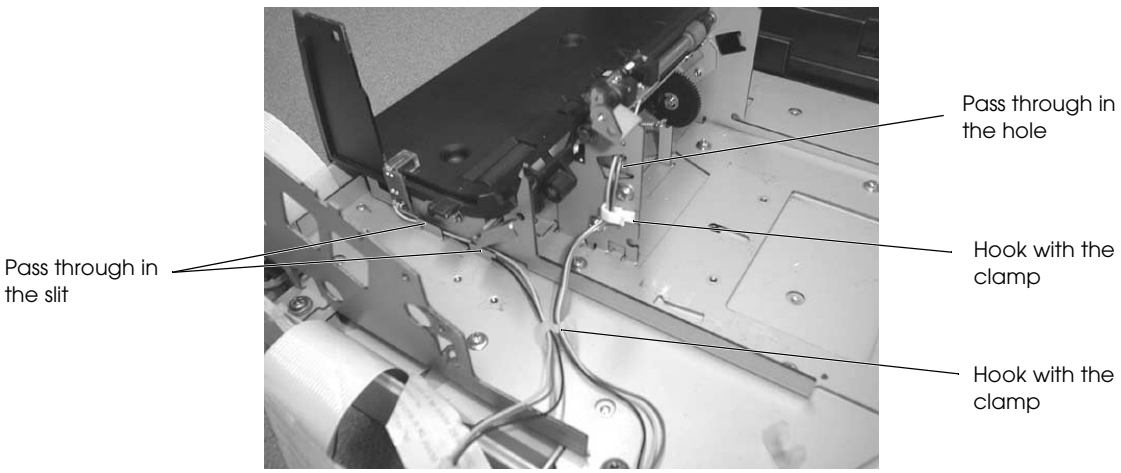


Figure 6-123 Arranging the cables

5. Secure the screw (C.P.T-B, 2.5 x 10) and plain washer (2.6 x 0.5 x 5).

Figure 6-124 Securing the screw and washer

6. Turn the screw you secured in the previous step 90 degrees in the counterclockwise direction.

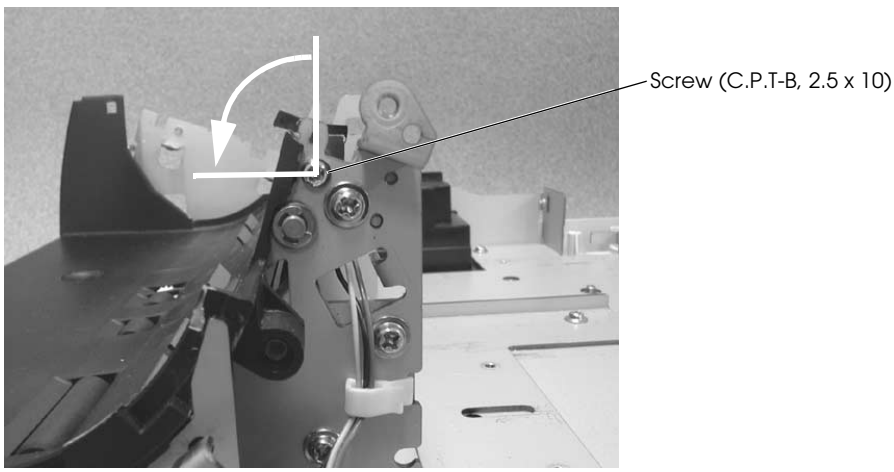


Figure 6-125 Loosening the screw

7. Apply the Green screw lock on the side of the screw (C.P.T-B, 2.5 x 10) and plain washer (2.6 x 0.5 x 5).

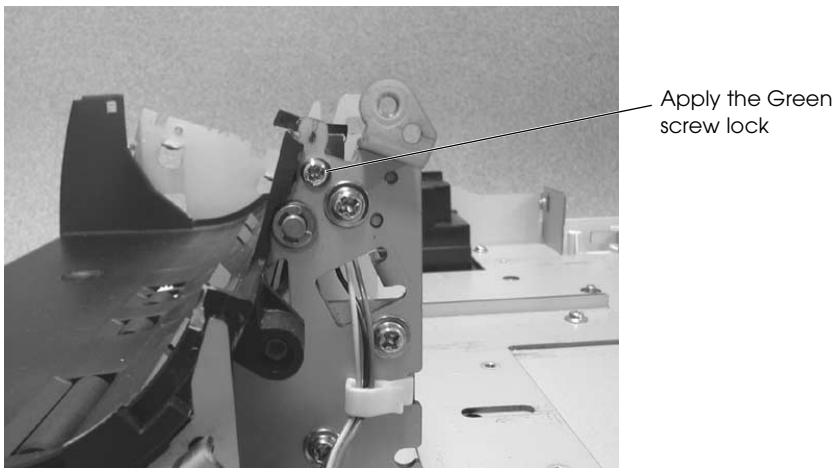


Figure 6-126 Applying the Green screw lock

8. Lubricate the three screws shown below with O-10. This is important to protect the **Main circuit board unit** from the metallic particles from the screw hole.

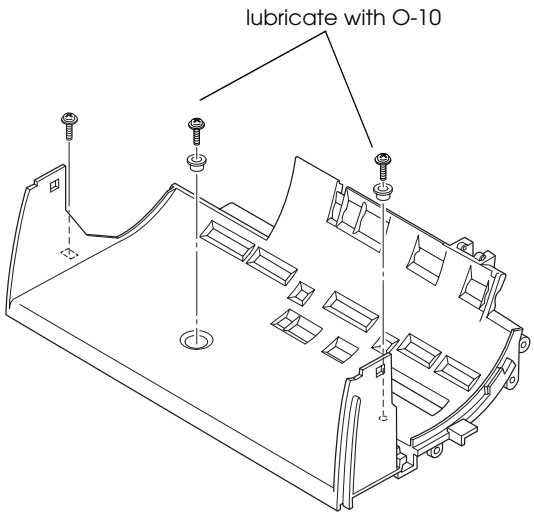


Figure 6-127 Lubricating the three screws

9. Set the two **Sleeve, S. paper guide** in the holes shown below and secure the three screws (C.C.S-tite, 3 x 6).

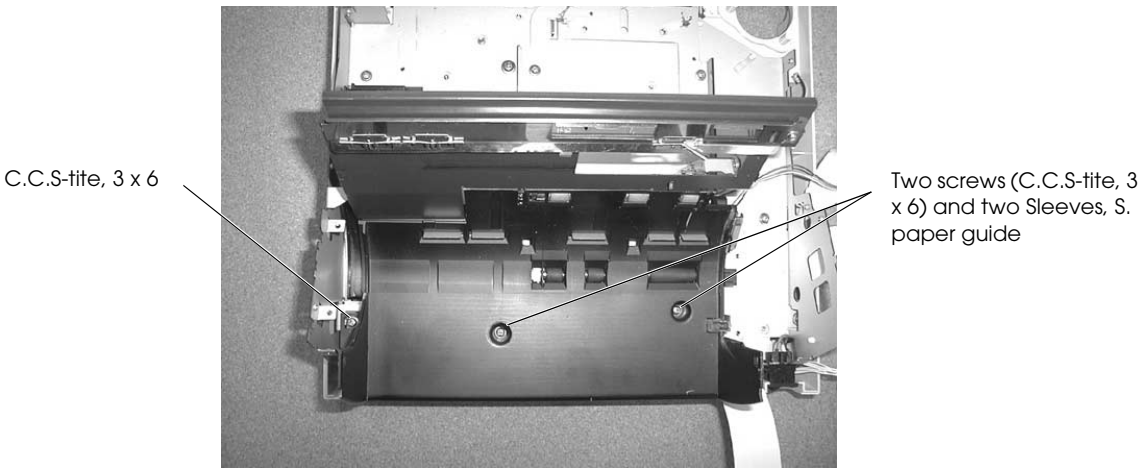


Figure 6-128 Securing the screws

10. While lifting up the slip detect lever, set the **Platen paper guide sub-assembly**.

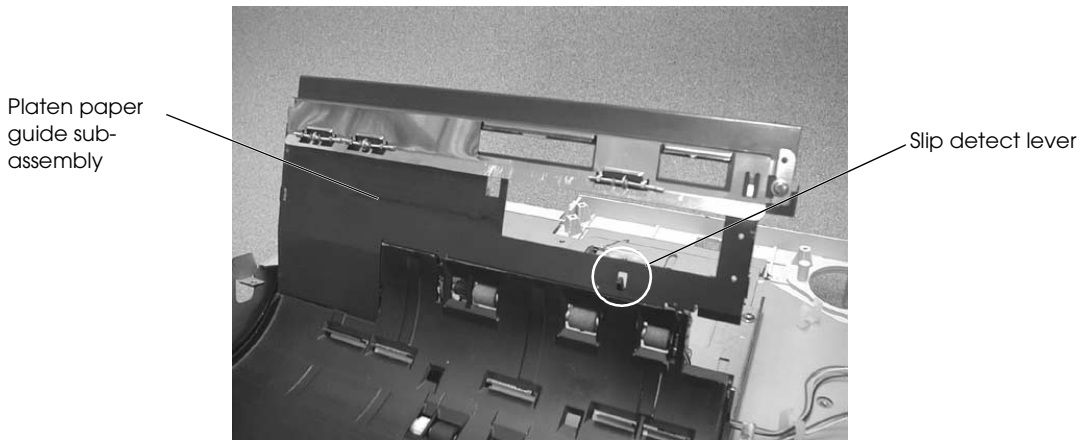


Figure 6-129 Setting the Platen paper guide sub-assembly

11. Hook the two **Springs, platen hold**.

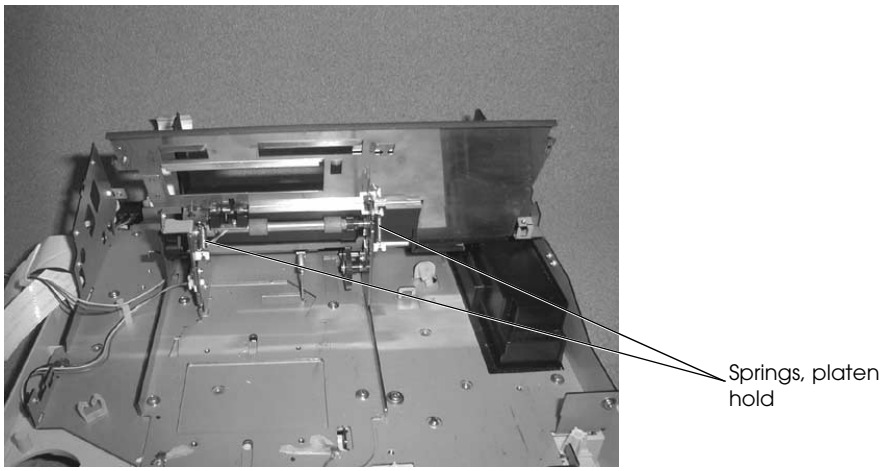


Figure 6-130 Hooking the Spring, platen hold

12. Install the following units. See the relevant section in this chapter.

    - **Shutter unit**
    - **Carriage unit**
    - **Cartridge frame unit**
    - **Roll paper unit**
    - **Pump unit**

13. Install the connector box. See the “Connector box” section in this chapter.

14. Install the covers. See the “Covers and upper case” section in this chapter.